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ABSTRACT

Designed for use in the Connecticut Regional Vocational Agriculture Centers, this curriculum provides exploratory and specialization units for four major areas of agriculture. These are Agriculture Mechanics, Animal Science, Natural Resources, and Plant Science. The exploratory units are required for grades 9 and 10, while the specialization units are intended for election in grades 11 and 12. Two outline charts show the sequence for instruction, suggested time for each unit, and topics covered in each unit for exploratory and specialization units. These units are provided: General Areas--Exploratory (Career Awareness, Future Farmers of America, Planning Experience Programs), Exploratory Agriculture Mechanics, Exploratory Animal Science, Exploratory Natural Resources, Exploratory Plant Science; and General Areas--Specialization (Agricultural Business Management, Career Preparation and Decision Making, Future Farmers of America, Records for Experience Programs), Specialization Agriculture Mechanics, Specialization Animal Science, Specialization Natural Resources, and Specialization Plant Science. Units follow a format including this information: unit title, length, grade level, objectives, content outline, teacher activities, student activities, evaluation, resources, bibliography, and media. (YLB)

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CONNECTICUT VOCATIONAL AGRICULTURE CURRICULUM

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INTRODUCTION: The suggested Connecticut Vocational Agriculture Curriculum has been designed for use in the Connecticut Regional Vocational Agriculture Centers. These centers are multi-staffed with three or more teachers of Vocational Agriculture who have each developed an expertise in one or more of the major areas of agriculture. The curriculum is based on the major areas of agriculture as being Animal Science, Plant Science, Agriculture Mechanics and Natural Resources.

A full program of Vocational Agriculture is based on four years of enrollment. The student would, in the first two years, be enrolled in exploratory units of study covering all four major areas of study. Development of fundamental skills, particularly in the Agriculture Mechanics area, would be stressed during the exploratory units.

The third and fourth year of enrollment would be made up of an election of units designed to best prepare the individual student to meet his or her vocational objective in agriculture.

Students will be involved with areas of study common to all of agriculture. These include career awareness, agriculture business management, leadership development and the practical application of learning by doing. While career awareness and agriculture business management are designed as specific units of instruction, leadership development will be handled by the organization of the Future Farmers of America Chapter and the learning by doing will be the supervised occupational experience program which each student shall carry out.

The organization of this curriculum includes charts of units printed on white. Each of the units are explained in detail in the major agricultural areas (called taxonomies) with General Areas printed on blue paper, agriculture mechanics on golden rod, animal science on yellow, natural resources on pink, and plant science on green.

The organization for sequence of instruction will be at the discretion of each center in accordance with availability of staff and facilities, as well as to serve the individual interest of students.

The development of this curriculum is the culmination of efforts by the total staff of Vocational Agriculture Teachers in Connecticut. Teachers authored the units of study. Each unit was exposed to a pilot period by a teacher other than the author. Editing to produce a common format has been done by teachers. It has not been possible to bring into this document all of the information which is available. It is intended that as additional information becomes available to teachers while using this curriculum, such information will be entered into the teachers copy so that a future curriculum edition may be more complete.

Suggestion for use of curriculum book:

CODING SYSTEM

Printed on white - outline charts of curriculum

Printed on blue - units of general application to all areas of agriculture

Printed on golden rod - units dealing with Agriculture Mechanics

Printed on yellow - units dealing with Animal Science

Printed on pink - units dealing with Natural Resources

Printed on green - units dealing with Plant Science

G - General
EM - Exploratory Agriculture Mechanics
EA - Exploratory Animal Science
ER - Exploratory Natural Resources
EP - Exploratory Plant Science
SM - Specialization Agriculture Mechanics
SA - Specialization Animal Science
SR - Specialization Natural Resources
SP - Specialization Plant Science
OE - Outline Exploratory
OS - Outline Specialization

* indicates number of weeks suggested to teach the unit or units. While it may most often be more feasible to schedule a unit in a continuous block of weeks, it could be practical, in some situations, to split the scheduling of a unit into different periods of the year in accordance with seasons, work schedules or other factors.

SCHEDULING

Since Exploratory Units are required of all grade 9 & 10 students, the scheduling can be established with little effort. The scheduling of Specialization Units will require that students in the latter stages of their grade ten year indicate the units of study which they would desire to be enrolled in for grade 11 & 12. This could be accomplished by making copies of the white specialized unit charts for each student. The task of scheduling units will require the shuffling of staff and facilities to best meet student requests. The scheduling of staff to teach more than one unit during a period of time may be necessary, and the use of individualized learning activity packets is encouraged.

A TEACHING GUIDE

The curriculum can guide the teacher in developing a plan of instruction for the unit and should be considered as such. Each teacher will want to be inovative in developing a plan which best fits their method of operation.

SCOPE AND SEQUENCE CHA - VOCATIONAL AGRICULTURE

EXPLORATORY AND DEVELOPMENT OF FUNDAMENTALS
GRADES 9 & 10
(REQUIRED)

GENERAL AREAS

(Applies to all Taxonomies)

* 15 weeks

Career Awareness EG 1

* 3 weeks

Identifying interests - Inventorying present salable skills - Studying aptitudes, attitudes and self-concept-aspirations - Establishing goals - Classifying agricultural occupations - Exploring production agriculture - Exploring agribusiness - Exploring specialized career opportunities in agriculture - Requisites of work - Routines of work - Returns of work - Using values clarification in self awareness - Using the decision making process in education and occupational planning

Future Farmers of America Basic Course EG 5

* 6 weeks

Local, state, national history - Aims and purposes - Motto, emblem - Creed - Chapter activities and officers - Constitution - Membership responsibilities Committee members - Five basic parliamentary procedure abilities - Group discussion leader - Awareness of recognition programs

Planning Experience Programs EG 8

* 6 weeks

Career development planning - Types of programs - Inventory of possibilities - Planning - Budgeting - Establishing the records - Evaluating records

SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM

Required out of school time carried out over 12 month year.

Entrepreneur, Employment and/or Directed Laboratory Experience

Each student will each year plan and carry out an experience program to be conducted as an entrepreneurship or as an employee at an enterprise classified as agriculture or one related to agriculture. Combinations or substitutions for the above may be appropriate. Program scope will be in accordance with availabitity and capability. Experience must be meaningful, educational and directed toward occupational objective of student.

EXPLORATORY AND
DEVELOPMENT OF
FUNDAMENTALS
GRADES 9 & 10
(REQUIRED)

AGRICULTURAL MECHANICS
(Basic Skills)
(6 Units of
3 weeks each
* 18 weeks

Electricity EM 1	* 3 weeks	Terminology - Reading diagrams - Materials and tools - Determining wire size - Fusing, splicing - Install wire, plugs, switches & outlets - Safety connectors - Computing cost and reading meter
Metal Soldering, Plumbing, Welding, Tool Sharpening and Fitting EM 4	* 3 weeks	Identify, bend and form metals - Cut, drill and thread metal - Cut thread and fit pipe - Solder metal and sweat tubing - Select electrodes and rods - Strike arc - Run fillet bead - Care and adjusting oxyacetylene unit - Use of oxyacetylene unit - Use of cutting torch - Braze and fusion welds - Fit handles - Sharpen and fit twist drills, plane blades, wood chisels, cold chisels and axe - True grinding wheel
Power Tools, Wood, Sketching & Drawing, Fasteners EM 11	* 3 weeks	Safe operation of power saws, sanders, jointers, planners, grinders & drills - Maintenance of power tools - Reading and interpreting drawings - Identification selection & use of drawing equipment - Developing bill of material - Identification, selection & use of fasteners (nails, screws, bolts, etc.) Saw to dimension, bore holes, and fasten wood properly
Shop Math, Safety, Painting & Glazing EM 16	* 3 weeks	Mathematics of agricultural mechanics - Safe facilities, equipment and practices - Preparing surfaces for selecting, mixing, applying and storage of paint for wood or metal - Measuring and cutting glass - Sash preparation and glass installation
Small Engines, Basic Care & Operation EM 19	* 3 weeks	Tool selection, storage and maintenance - Use of owner operator manuals - Trouble-shooting - Diagnosing engine failure - Using test equipment - Periodic maintenance and upkeep - Maintaining mower blades - Safe operation
Tractor Driving EM 23	* 3 weeks	Know hand signals - Know tractor symbols and/or labels - Check tractor for tire pressure, coolant, oil, fuel, battery, hydraulics, lights, brakes, seat adjustment and safety hazards - Start and stop engine - Operation

EXPLORATORY AND DEVELOPMENT OF FUNDAMENTALS GRADES 9 & 10 (REQUIRED)

ANIMAL SCIENCE (Fundamentals of Animal Care)
* 15 weeks

Animal Health EA 1	* 3 weeks	Detecting health problems - Restraining animals - Sanitation practices - Administration of mecication and first aid.
Animal Housing EA 5	* 3 weeks	Planning facilities - Determining space requirements - environmental controls and special requirements effecting housing
Animal Nutrition EA 7	* 3 weeks	Identify parts and function of digestive systems - Identification of feeds and feed stuffs - Balancing rations - Developing a total feeding program
Animal Selection EA 10	* 3 weeks	Breed Identification - Terminology - Parts of animals - Basic judging
Forage Crops EA 13	* 3 weeks	Identification of forage crops - Soil preparation, fertilization, planting, weed control, harvesting and storage of crops - Identification of weeds, plant growth and quality of feed - Yield checking and forage evaluation

NATURAL RESOURCES (An appreciation of managing)
* 9 weeks

Conservation of Natural Resources ER 1	* 3 weeks	Careers - Conservation of soil, water, and natural fauna and flora - Pollution control
Forestry & Wildlife Management ER 6	* 3 weeks	Appreciating forestry and wildlife contributing to mankind - How forests reproduce - Forest products and uses - Careers - Development of wildlife and fish habitats
Outdoor Safety ER 10	* 3 weeks	Avoiding accidents and injuries - Inventory unsafe conditions - Fundamentals of first aid - Red Cross

EXPLORATORY & DEVELOPMENT OF FUNDAMENTALS
GRADE 9 & 10
(REQUIRED)

PLANT SCIENCE
Care & Management of Plants
* 15 weeks

Agricultural Pest Control EP 1 * 3 weeks	Terminology - Safe use of chemicals - Determine methods for application - Determine various control programs possible - Prepare for Connecticut Operators License exam - Careers
Care & Management of a Vegetable Garden EP 4 * 3 weeks	Select site - Develop garden plan - Planting and care of garden - Develop pest and weed control program - Identify common vegetables and plants
Greenhouse Management EP 6 * 3 weeks	Facilities and equipment - Operation of plant-Handling crops
Plant Identification EP 8 * 3 weeks	Use of plant identification keys - Knowledge of botanical names - Collect specimens - Relate plants to environmental requirements
Soils & Fertilizer EP 10 * 3 weeks	Terminology - Careers - Test soils - Identify soil types - Determine liming and fertilizer program - Use soils maps - Match crops to soils

GENERAL AREAS
(Applies to all Taxonomies)

UNIT: Career Awareness

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9, 10. Teach early in the freshman year and integrate, where appropriate, the career implication of the subject matter taught throughout the program.

OBJECTIVES: The student will:

1. develop self awareness by studying individual interests, aptitudes, abilities, aspirations, likes and dislikes.
2. develop career awareness by studying careers within the major classifications of agriculture/abribusiness.
3. develop an understanding of the dimensions of work (requisition, routines, returns in career planning.)
4. develop values, classification, and decision making skills for next step of educational and occupational planning.

CONTENT:

I. Self awareness

   A. identifying interests, likes and dislikes
   B. inventorying present saleable skills
   C. studying aptitudes, attitudes and self concept
   D. becoming aware of educational and career aspirations
   E. establishing long range goals and short range objectives

II. Career awareness

   A. Classifying agriculture occupations:

by industry

food
dairy
feed
meat & livestock
farm equipment
farm supplies
ornamental horticulture
financial services
government
cotton
animal health
breed associations
other

by functions

research and development
communications
education
finance
production
engineering
government
marketing/sales
processing
transportation
quality control
other

by level

unskilled
semi-skilled
skilled
technical
managerial
professional

by enterprises

swine
beef
dairy
sheep
poultry
corn
oats
nursery
fruit
greenhouse
other

B. exploring production agriculture
C. exploring abribusiness
D. exploring specialized career opportunities in agriculture

III. Dimensions of work

A. requisites of work (what it takes to get and do the job)

1. general education requisites

a. reading, writing, speaking, listening skills
b. social, human relations, and dependability skills
c. reasoning and intellectual skills

2. specific work requisites

a. particular knowledge, skills and proficiencies needed to perform some specified work routine
b. ability to adjust to the physical and social setting of the work place
c. abiltiy to adjust and adapt to a changing labor market and agricultural economy

B. routines of work (what a person does on a job):

Content of Work
Working with

Data	People	Things
synthesizing	mentoring	setting-up
coordinating	negotiating	precision working
analyzing	instructing	operating
compiling	supervising	driving-operation
computing	diverting	manipulating
copying	persuading	tending
comparing	speaking	feeding
	serving	caring for
		handling

C. returns of work (what a person gets from doing the job)

   1. earnings: the rate at which a person is paid for time spent working, including direct pay and fringe benefits
   2. prestige: the social esteem given to a person who holds a particular work position
   3. power: the influence over the behavior of other persons which one derives from holding a work position
   4. autonomy: the freedom to control how one conducts one's own work
   5. associations: the type and quality of interpersonal relationships that can be formed as a result of holding a work position
   6. social benefits: the opportunity to contribute to the benefit of others or the public good

IV. values clarification and decision making

   A. becoming aware of and using the values clarification process in self awareness
   B. becoming aware of and using the decision making process in educational and occupational planning

TEACHER ACTIVITIES:

1. Prepare self awareness activities and lessons.

2. Collect and make available brochures, pamphlets, audio-visuals, and other materials on agricultural careers.

3. Organize a field trip to a farm and an agribusiness to help students explore employment and career opportunities.

4. Help each student develop a folder which includes self and career awareness materials and plans.

STUDENT ACTIVITIES:

1. Maintain a notebook on class presentations and discussions and a folder for career related materials.

2. Write a report on self awareness including interests (what I like to do), aptitudes (what I do well), abilities (what I have done), and aspirations (what I want to do or be).

3. Identify and explore three different occupations of interest to them.

4. Interview a worker in an occupation of interest.

5. Discuss dimension of work with parents or a working adult and report findings in class.

6. Make preliminary long range and short range educational and occupational plans and update periodically.

EVALUATION:

1. Evaluate pupil notebooks, reports and plans.

2. Use end of unit examination and periodic quizzes.

RESOURCES:

1. Materials on career opportunities in agriculture/agribusiness.

2. Field trip sites and/or resource speakers.

3. Guidance office personnel or materials.

4. Self awareness, values clarification and decision making materials and audio-visuals.

5. Results of individual interest inventories and aptitude tests available from the custodian of records in the school.

BIBLIOGRAPHY:

1. Dictionary of Occupational Titles, U.S. Department of Labor, Washington, D.C.

2. Occupational Outlook Handbook, U.S. Department of Labor, Bureau of Labor Statistics, Washington, D.C. March 1980.

3. Occupational Outlook Quarterly, U.S. Department of Labor, Bureau of Labor Statistics, Washington, D.C.

4. National Agricultural Occupations Competency Study, U.S. Department Health, Education, and Welfare, Washington, D.C. 1978.

MEDIA:

1. Selected filmstrips from career education specialist.

2. Charts on agricultural careers.

GENERAL AREAS
(Applies to all Taxonomies)

UNIT: Future Farmers of America (FFA) Basic Course

LENGTH: 6 Weeks

WHEN TAUGHT: Grade 9, 10. Introductory core unit for all students of vocational agriculture.

OBJECTIVES: The student will be able to:

1. without benefit of notes to recall important historical and current facts regarding the history and status of the FFA in the country, in Connecticut, and in the local vocational agriculture center.
2. state the aim and purposes of the FFA.
3. write the FFA motto and tell what it means.
4. recite from memory the FFA creed without error.
5. recite from memory the part in the FFA opening ceremony in which all members respond to the president in unison.
6. when given a component part of the FFA emblem, state what that part stands for.
7. list the names of the officers of the local chapter without error.
8. list the major activities of the local chapter for the past year.
9. list three major advantages of becoming a member of the FFA.
10. demonstrate committee responsibilities.
11. demonstrate basic parliamentary abilities.
12. lead a group discussion for fifteen minutes.
13. have an awareness of FFA recognition programs.
14. complete application form for Greenhand degree.
15. Complete application for Chapter Farmer/Agribusiness degree.

CONTENT:

I. History & structure of the FFA organization
    A. national
    B. state
    C. local

II. Chapter organization and ceremonies
    A. aims and purposes

  - B. motto
  - C. creed
  - D. emblems
  - E. opening members ceremonies
  - F. chapter officers

III. Chapter activities

  - A. program of activities
  - B. budget
  - C. constitution

IV. Membership activities

  - A. membership degrees
  - B. committees
  - C. parliamentary procedure
  - D. group discussions
  - E. awareness of recognition programs
  - F. degree applications

TEACHER ACTIVITIES:

1. Use of National FFA prepared instructional materials

  - A. references
  - B. audio-visuals
  - C. official FFA jacket
  - D. official paraphernalia

2. Use of resource people

  - A. chapter officers
  - B. state officers
  - C. alumni
  - D. others

3. Use of competitive events and motivational activities

  - A. public speaking contests
  - B. creed contest
  - C. parliamentary procedure
  - D. mini-chapter officers
  - E. use of committees

STUDENT ACTIVITIES:

1. Participation in committees.

2. Attend chapter meetings.

3. Participation in local, district, and state activities.

4. Maintain records on leadership activities.

EVALUATION:

1. Review notebooks regularly.
2. Evaluate demonstration of leadership abilities.
3. Use of quizzes and tests.
4. Review completed Greenhand application.
5. Review completed Chapter Farmer/Agribusinessperson application.

RESOURCES:

1. Contact State Education Department for State publications on the FFA and resource people in the State.
2. Use of official FFA materials, to include:
    - A. official manual
    - B. student handbook
    - C. advisors handbook
    - D. selected audio-visuals
    - E. treasurers and secretary book
    - F. activity handbook
    - G. chapter guide
    - H. chapter paraphernalia
    - J. official FFA supply catalog
3. Chapter files.

BIBLIOGRAPHY:

1. National FFA Center, Box 15160, Alexandria, VA 22309
(See resource list above)

MEDIA:

1. Transparencies.
2. Selected films, slides, tapes from FFA Supply Service.

GENERAL AREAS
(Applies to all Taxonomies)

UNIT: Planning Experience Programs

LENGTH: 6 Weeks

WHEN TAUGHT: Grade 9, 10.

OBJECTIVES: The student will be able to:

1. be aware of the importance of how SOEP fits into the development of personal goals.

2. select a program which will relate to their individual plans.

3. plan and develop a SOEP.

4. establish, maintain and evaluate individual records.

CONTENT:

I. Importance of the supervised programs

   A. career planning
   B. money management
   C. skill development
   D. establishment into the world of work
   E. Department requirements

II. Selecting a program

   A. types of programs

      1. productive enterprise
      2. placement program
      3. improvement projects
      4. supplementary practices

   B. Inventory of possibilities

      1. location of work
      2. jobs available
      3. facilities available
      4. interests

III. Developing a program

   A. making plans

      1. long time plans
      2. short time plans

   B. budgeting

      1. plans for financing
      2. expenses & receipts

IV. Establishing records

   A. using the official Connecticut record books

      1. plans
      2. agreements
      3. inventory - financial statements
      4. daily and monthly records

V. Record evaluation

   A. efficiency factors
   B. accuracy and completeness
   C. comparisons

TEACHER ACTIVITIES:

1. Use of resource people who have successfully established SOEP.

2. Use of select field trips to SOEP.

3. Use of record books.

4. Use lectures.

5. Use current employment opportunity data.

STUDENT ACTIVITIES:

1. Maintain SOEP record book.

2. Students will maintain a notebook on lecture and discussion sessions.

3. Others.

EVALUATION:

1. Review records periodically.

2. Grade based upon record book and quizzes.

3. Establishment of SOEP.

4. Periodic evaluation by supervisor and/or employer.

RESOURCES:

1. Resource personnel

   A. employers
   B. alumni
   C. older agriculture students
   D. guidance counselors

2. Approved State SOEP record books

- A. proficiency award application
- B. career guides suitable

BIBLIOGRAPHY:

1. Record books available from FFA Supply Service, Alexandria, VA.
    - A. Guide For Using Vocational Agriculture Record Book For Production Agriculture
    - B. Record Book For Placement/Directed Laboratory Experience Program
    - C. Record Book For Basic Experience Program
    - D. Record Book For Ownership Experience Program

2. Vocational Agriculture Record Book For Agricultural Production, The French-Bray Printing Company, Glen Burnie, MD 21061.

3. Supervised Occupational Experience in Agriculture, Plans and Records, The French-Bray Printing Company, Glen Burnie, MD 21061.

4. National Ag Occupations Competency Study, U.S. Department of Health, Education and Welfare, Washington, D.C.

MEDIA:

1. More Than Profit, slides, National FFA Supply Service.

2. FFA-Preparing For Progress, slides, National FFA Supply Service.

AGRICULTURAL MECHANICS

UNIT: Electricity

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9 or 10.

OBJECTIVES: The student will be able to:

1. define and understand electrical terms.
2. understand generation and magnetism.
3. make and follow simple wiring diagrams.
4. identify and select the electrical materials.
5. determine wire sizes, use voltage drop charts, and determine proper fuse size.
6. wire plugs, switches and outlets.
7. work safely with electricity and make electricity work safely.

CONTENT:

I. Define terms: A.C., D.C., generation, amp, volt, watt, kilowatt, cycle, phase, ohm, transformer, circuit, series and parallel circuits.

II. Electrical principles

  A. generation
  B. transmission
  C. distribution

III. Wiring diagrams

  A. symbols
  B. reading
  C. producing

IV. Selection and identification of wiring materials

  A. wire
  B. fuses
  C. switches
  D. outlets
  E. other materials
  F. tools

V. Fusing and wire sizes

  A. circuits
  B. voltage drop charts
  C. wiring boards

VI. Electrical skills

- A. reading a meter
- B. computing an electrical bill
- C. wiring switches, boxes, outlets and plugs
- D. running simple circuits

VII. Electrical safety

- A. national electrical code
- B. underwriters lab
- C. grounding

TEACHER ACTIVITIES:

1. Explain and discuss electrical terms.

2. Demonstrate electricity and electrical terms by using wiring boards.

3. Show how to calculate wattage, volts, amps, ohms, fuse size, wire size, voltage drop, kilowatts, kilowatt hours, and power costs.

4. Show and discuss use of electrical materials and equipment.

5. Demonstrate how to make connections, splices, wiring switches, outlets, plugs, etc.

6. Field trip to an electrical shop and power plant.

STUDENT ACTIVITIES:

1. Learn and understand electrical terms.

2. Do problem solving involving electricity.

3. Learn to identify electrical materials and tools.

4. Learn safety with electricity.

5. Learn to use wire size charts.

6. Learn to read a meter and compute monthly costs.

7. Learn circuits by using electrical board.

8. Perform wiring skills.

EVALUATION:

1. Notebook

2. Tests and quizzes

3. Lab sheets

4. Practical work

RESOURCES:

1. Vo-Ag shop and equipment
2. Wiring board
3. Wiring materials and electrical flash cards
4. Electric meters
5. Electrical supply house or repair shop
6. Power company

BIBLIOGRAPHY:

1. Basic Electricity & Practical Wiring, Hobar Publications.
2. Maintaining the Home Wiring System, AAVIM, Athens, GA, 1974.
3. Agricultural Wiring Handbook, Edison Electric Co.
4. Erpelding, Electrical Lesson Plans, Interstate, Danville, IL.
5. Hamilton, J.R., Using Electricity, Prentice-Hall, Inc. Englewood Cliffs, N.J., 1959.
6. Understanding Electricity & Electrical Terms, AAVIM, Athens, GA, 1974.
7. National Electric Code 1980, National Fire Protection Association, Boston, MA.
8. Richter, H.P., Wiring Simplified, 32nd Ed., Park Publishing, Inc., St. Paul, MN, 1977.

MEDIA:

1. Electrical Identification Kit, Interstate
2. 16mm Films form Northeast Utilities:
   - a. Electricity - The Way It Works
   - b. Principles of Electricity
   - c. Fundamentals of AC & DC Generation
   - d. What is Electricity?
   - e. Split Second Safety
   - f. Reaching for Lightning
3. Filmstrips
   - a. Electrical Terms Part I & II - AAVIM
   - b. Diagraming Electrical Wiring Circuits - Vocational Agriculture Services
4. Transparencies

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Metal, Soldering, Plumbing, Welding, Tool Sharpening and Fitting

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9, or 10.

OBJECTIVES: The student will be able to:

1. identify common metals.
2. identify basic metal working tools.
3. use a tap and die, drill charts.
4. sharpen a twist, drill, plane blade or wood chisel, cold chisel and screw driver.
5. cut, thread and fit galvanized pipe.
6. cut and sweat copper tubing and fittings.
7. safely operate the power grinder, power hacksaw, drill press and metal working hand tools.
8. use calipers, micrometers, rulers, scribers, and screw pitch gauge.
9. select the best type of welding equipment with respect to the job to be done.
10. select the proper type of electrode, or filler rod for the job to be done.
11. make correct electric arc welds in mild steel and cast iron.
12. make correct oxyacetylene welds in mild steel and cast iron.
13. determine quality and strength of weld.
14. identify some of the more common metals.
15. properly and safely care for welding equipment and supplies.
16. properly braye sheet metal and cast iron.
17. cut a hole in mild steel with the arc welder and oxyacetylene cutting torch.
18. properly rehandle on tool - preferably an axe.
19. reshape and sharpen an axe or hatchet and one other cutting tool using gauges and correct procedures.

20. be aware of the danger involved in using dull, mushroomed or insecurely handled tools.

CONTENT:

I. Safety

   A. eye protection needed
   B. body protection, including hands and face
   C. fire extinguishers and how to use them
   D. fire blanket and use

II. Nut and bolt threading

   A. select round iron
   B. prepare round iron for using a die
   C. cut threads with a die
   D. select hand iron for a nut
   E. find center, and center punch
   F. select correct drill for threaded rod
   G. select tap and die
   H. clean-up when done

III. Pipe threading

   A. cut pipe to correct measurement
   B. ream pipe
   C. thread pipe

IV. Plastic pipe

   A. cut pipe to correct measurement
   B. prepare pipe
   C. Connect using proper material

V. Copper tubing

   A. cutting
   B. reaming
   C. soldering joints

VI. Sharpening tools

   A. use a template
   B. check for sharpness

VII. Metal lathe

   A. select metal
   B. place in chuck
   C. adjust cutter
   D. calculate depth of cut
   E. adjusting cutter
   F. placing angle on lathe
   G. finishing piece

VIII. Soldering

- A. cutting metal
- B. preparing for solder
- C. using flux
- D. heating and applying solder

IX. Selecting electrodes

- A. type of welder
- B. kind of metal
- C. thickness of metal
- D. position of joint

X. Stricking an arc

- A. scratching
- B. taping

XI. Running a bead

- A. tiltelectrode in line of travel
- B. clean metal between beads
- C. cooling for strength

XII. Kinds of welds

- A. flat
- B. horizontal
- C. fillet

XIII. Welding with oxyacetylene

- A. safe set-up
- B. adjusting flame for welding, brazing, and cutting
- C. correct angles.

XIV. Brazing

- A. proper metal
- B. select pressures and top
- C. use oxydizing flame
- D. use bronze rod and flux

XV. Safety in tool sharpening and fitting

- A. grinder use
- B. grinder care - dressing and truing wheels, adjusting tool rest
- C. tools - mushroomed heads, loose handles, dull tools, injuries during sharpening
- D. guards - axe

XVI. Reshaping and sharpening an axe or hatchet

   - A. laying out curve
   - B. grinding out nicks
   - C. using gauge to grind blade to proper taper
   - D. using files and stones to sharpen blade

XVII. Sharpening other tools

   - A. use of gauges
   - B. reshaping
   - C. honing
   - D. testing for sharpness

XVIII. Replacing handles

   - A. removing broken handles
   - B. cleaning eye
   - C. shaping handle and checking alignment
   - D. resawing kerf
   - E. wedging
   - F. finishing and sealing

TEACHER ACTIVITIES:

1. Hand out prepared directions for each exercise.

2. Demonstrate:

   - A. use of chart for tap and die
   - B. use of drill, tap and die
   - C. use of measuring tools
   - D. cutting pipe threads
   - E. reaming pipe
   - F. preparing plastic pipe
   - G. cutting copper tubing
   - H. cleaning copper tubing
   - I. sweating a joint
   - J. use of a template
   - K. sharpening a twist drill, cold chisel, plane blade
   - L. placing stick in metal lathe
   - M. adjusting metal lathe
   - N. measuring stock

3. Evaluate students' projects.

4. Observe and supervise student activities.

5. Show slides, film strips and discuss types of welder and proper operation of equipment.

6. Demonstrate:

   - A. ways to strick an arc.
   - B. running a bead.
   - C. setting up oxyacetylene equipment.
   - D. flame adjustments.
   - E. cutting.

    F. welding with oxyacetylene.
    G. brazing with oxyacetylene.

7. Secure materials to work with.

8. Pre-assignment at least one week before unit begins: each student will obtain from home, employer, friend or school shop - 1 tool to sharpen and one to rehandle and obtain handles.

9. Introduction: show examples of dull, mushroomed, and poorly handled tools. Emphasize cost, inconvenience, and danger factors.

10. Demonstrate proper method of sharpening and refitting tools.

STUDENT ACTIVITIES:

1. Complete exercised assigned.

2. Bring in tools to be sharpened.

3. Follow all safety practices.

4. Practice:

    A. running a bead.
    B. padding.
    C. welding two pieces of metal together - flat weld.
    D. lighting a blow pipe.
    E. running a fusion weld.
    F. welding two pieces of metal together with oxyacetylene and filler rod.
    G. brazing two pieces of metal together.

5. Obtain tools for fitting and handles before unit begins.

6. Maintain a notebook of notes and reference materials handed out.

7. Fit one handle for teacher evaluation.

8. Reshape and sharpen an axe or hatchet for evaluation.

9. Sharpen one other tool for evaluation.

10. Make some type of simple guard for a cutting tool.

11. Make a handle holder to protect handles from vise jaws.

12. Make an axe taper gauge.

EVALUATION:

1. Score sheets for each exercise.

2. Written quizzes and exams.

3. Evaluate notebook.

4. Follow-up evaluation of students' projects.

RESOURCES:

1. Students' and parents' tools.

2. School supplied materials.

3. Work sheets.

4. Test books.

5. Filmstrip and casette (pipe fitting).

6. Examples of good welds, cutting, brazing, mushroomed heads, loose handles and broken eyes.

7. Gauges and vise handle holder.

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1. Arc Welded Projects, Vol.I c. 1958 and Vol.II, c. 1978, The James F. Lincoln Arc Welding Foundation.

2. Jefferson, T.B. and Woods, Gorham, Metals and How to Weld Them, The James F. Lincoln Foundation.

3. Jones, Mack, Shopwork on the Farm, McGraw Hill, 1945.

4. Roehl and Longhouse, Farmers Shop Book, Bruce Publishing Co., 1953.

5. Phipps, ect., Farm Mechanics Text and Handbook, the Interstate Publishing Co.

6. Seeber, Glenn & Allen, Ray, Oxyacetylene Welding, California State Polytechnical College.

7. Sharpening Hand Tools, Vocational Agriculture Service College of Agriculture, Urbanco, IL.

8. Sharpening a Plane Iron, Department of Agricultural Education, Pennsylvania State University.

9. Sharpening a Twist Drill Bit, Department of Education, Pennsylvania State University.

10. Sharpening a Wood Chisel, Department of Agricultural Education, Pennsylvania State University.

11. Shinn, Weston, Working in Agricultural Mechanics, Gregg/McGraw Hill, 1978.

12. Simmons, Fred C., The Northeastern Loggars Handbook, USDA Handbook #6, U.S. Government Printing Service, 1951.

13. Sossin, H.A., Arc Welding Instructions for Beginners, The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio 44117.

14. Welding, FOS, Deere & Company, Molise, 1971.

MEDIA:

1. Pipe fitting filmstrip and cassette.
2. Lincoln Arc Welding Filmstrip.
3. VEP Oxyacetylene Welding Filmstrip.
4. Welding overhead transparencies.
5. Arc welding film.
6. Models for various excercises.

AGRICULTURAL MECHANICS

UNIT: Power Tools, Wood, Sketching & Drawing, Fastners

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9 or 10.

OBJECTIVES: The student will be able to:

1. Power Tools
    - A. operate power tools safely.
    - B. determine if power tool is usable.
    - C. maintain power tools.
    - D. identify tools and parts.
2. Sketching and Drawing
    - A. read and interpret drawings.
    - B. read a scale.
    - C. figure bill of material.
    - D. make a drawing to scale.
    - E. select and identify drawing equipment.
3. Fastners
    - A. identity and select appropriate fastners.
4. Wood
    - A. select kinds and grades of lumber.
    - B. lay out and construct wood project.
    - C. identify and use woodworking tools safely.

CONTENT:

I. Power Tools

- A. Introduction to tools and uses of power tools in agriculture/agribusiness.
    1. relationship to careers in agriculture
    2. general electrical safety review
    3. purchase of power tools - how to buy
    4. the owner's manual
- B. Saws. Cover part identification, blade selection, safe operational procedures, general safety practices for:
    1. bench saw
    2. band saw
    3. sabre saw
    4. radial arm saw
    5. portable circular saw

6. metal cutting band saw
7. others you may wish to cover, ie: jigsaw, reciprocating saw, etc.

C. Sanders. Cover part identification, abrasive selection, safe operational procedures and use, and general safety practices for:

1. finish sander
2. belt sander
3. disc sander
4. others - air sander, etc.

D. Other wood tools. Cover part identification, safe operational procedures, and general safety practices for:

1. router
2. jointer
3. others - wood lathe, planer-surfacer, etc.

E. Drills. Cover part identification, selection and sharpening of drills, safe operational procedures, general safety practices for:

1. drill press
2. portable drills
3. others

F. Grinders. Cover part identification, selection and care of abrasives and stones, safe operational procedures, general safety practices for:

1. grinders (bench and pedestal)
2. portable grinders
3. belt grinders
4. others

II. Sketching and Drawing

A. Care and Use of Material

1. drawing tools and equipment
2. paper

B. Sketching

1. symbols and lines
2. margin
3. using scale and tools
4. views of objects
5. types of sketches
6. freehand and scale

C. Lettering

1. types

        2. spacing
        3. neatness

III. Fastners

- A. nails
    1. types
    2. sizes
    3. uses
- B. screws
    1. types
    2. sizes
    3. uses
- C. bolts
    1. types
    2. sizes
    3. uses
- D. Hinges, glue, etc.
    1. types and uses

IV. Wood

- A. bill of materials
    1. units of measure
    2. kind and grades of lumber and materials
    3. cost
- B. selecting project
- C. selecting materials
- D. constructing project

TEACHER ACTIVITIES:

1. Demonstrate proper adjustment and operational features of tools being studied.

2. Provide identification, reading questions, safety exam for tools being studied.

3. A field trip or a guest lecturer from the community to discuss power tools and safety, purchase of tools.

4. Provide operator manuals and texts for students.

5. Demonstrate proper sketching and drawing techniques.

6. Provide necessary tools and materials for sketching and drawing.

7. Provide a variety of fastners for student identification and use.

8. Demonstrate lay out and construction of woodworking project.

9. Provide lab sheets, reference materials and evaluation material.

STUDENT ACTIVITIES:

1. Bring in own power tools from home.

2. Develop list of possible power tools to use in career area of student's choice in agriculture.

3. Complete work pages and safety exam on each tool covered in class and keep in notebook.

4. Operate each tool proficiently and safely.

5. Complete an activity of student's choice using tools covered.

6. Figure a bill of materials.

7. Sketch, draw and construct woodworking project.

8. Identify and select fastners.

EVALUATION:

1. Worksheets and safety exams.

2. Notebooks.

3. Evaluate activity participation.

4. Evaluate sketches, drawings and projects.

RESOURCES:

1. Local community resources, stores, individuals, other shop teachers.

2. Supply catalogs, owner manuals.

3. Student's own tools.

4. Vo-Ag power tools, department supply resources.

BIBLIOGRAPHY:

1. Power Tool Safety and Operation, Hobar Publications, 1305 Tiller Lane, St. Paul, MN, 55112.

2. Mechanics in Agriculture, Interstate Publishers.

3. Shop Safety Skills, AAVIM, Athens, GA 1979.

4. Phipps, Cook, etc., Farm Mechanic Test and Handbook, Interstate Printers and Publishers, Danville, IL.

5. Shin, Glen C. and Weston, Curis R., Working in Agricultural Mechanics, Gregg Division, McGraw-Hill Book Co., 1978.

6. Wakeman, McCoy, The Farm Shop, The McMillan Co., 1960, New York, NY.

MEDIA:

1. Filmstrips from AAVIM.

2. Overheads and other material - Stanley Tools.

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Shop Math, Safety, Painting & Glazing

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9, 10.

OBJECTIVES: The student will be able to:

1. understand and appreciate the importance of a good mathematics background required in agricultural mechanics.
2. read and compute math problems as related to agricultural mechanics.
3. understand and follow safety measures in agricultural mechanics.
4. appreciate the importance of using good paint and wood preservatives.
5. prepare a surface for painting.
6. mix and apply paint.
7. clean and store painting equipment.
8. measure and cut glass.
9. prepare a sash for fitting and fastening the glass.

CONTENT:

I. Shop math

   A. applying dimensions to drawings.
   B. figuring bills of materials.
   C. computing board feet
   D. reading rulers, squares, levels and gauges
   E. metric conversion
   F. determining ratios (e.g. concrete mixtures)
   G. determining areas, volume, capacity and weight

II. Shop safety

   A. shop dress
   B. shop behavior
   C. color dynamics & symbols
   D. fire fighting procedure and equipment
   E. handling materials
   F. lifting materials
   G. preventing falls
   H. carbon monoxide and fumes (ventilation)
   I. electricity & lighting
   J. compressed air safety
   K. general first aid shop procedure

- L. hand tool safety
- M. power tool safety
- N. OSHA

III. Painting

- A. importance of painting
- B. kinds of paint and wood preservatives
- C. ingredients in paint
- D. selecting paint
- E. estimating amount of paint needed
- F. mixing paint
- G. storing paint
- H. brushing
- I. rolling
- J. spraying
- K. cleaning and storing equipment
- L. masking
- N, preparing surfaces
- M. finishing and refinishing

IV. Glazing

- A. importance of glazing
- B. measuring glass
- C. cleaning and cutting glass
- D. preparing a sash and fitting glass
- E. glazing compound

TEACHER ACTIVITIES:

1. Use lectures and discussion periods to:
   - A. review math appropriate to agricutlure mechanics.
   - B. acquaint students with safety measures.
   - C. provide students with the proper knowledge of painting and glazing.

2. Demonstrate proper painting methods and glazing techniques.

3. Prepare shop projects and activities to provide the skill training necessary.

4. Provide the lab sheets, materials, equipment, references and exams to accomplish objectives.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture and discussion.

2. Complete lab sheets.

3. Participate in classroom discussion.

4. Perform practical math activities in order to accomplish objectives.

5. Prepare a surface of wood and metal and apply paint properly.
6. Cup glass and properly apply glass to a sash.
7. Participate in a practical and written exam.

EVALUATION:

1. All practical projects will be evaluated.
2. Quizzes and written test on all material.
3. Lab sheets will be evaluated.

RESOURCES:

1. Vo-ag agricultural mechanics shop.
2. Paint, glass and frames.
3. Direction labels.
4. Reference materials.

BIBLIOGRAPHY:

1. Phipps, Farm Mechanics Text and Handbook, The Interstate Printers & Publishing , Inc., Danville, Il. 1959.
2. Phipps, Mechanics in Agriculture, Interstate Publishers, 1967.
3. Arithmetic in Agriculture, Interstate Printers & Publishers.
4. Developing Shop Safety Skills, AAVIM, Athens, Ga., 1979.
5. National Ag Occupations Competency Study, U.S. Department of Health, Education, and Welfare.

MEDIA:

1. Filmstrips from AAVIM and Colonial Film.
2. Spray Painting Visuals, Vocational Agricultural Services, Urbana, IL.
3. Stanley Tools, charts and overheads.

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Small Engines, Basic Care & Operation

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9, 10.

OBJECTIVES: The student will be able to:

1. understand the principles of operation (compression, carburetion, ignition).
2. select proper repair parts needed to tune up the engines using service manuals, microfilm, and owner's mannuals.
3. replace spark plug using proper tools.
4. gap spark plug using proper tool.
5. clean and regap a spark plug.
6. replace and adjust ignition points using proper tools.
7. test condenser using testing equipment.
8. test and coil using testing equipment.
9. use safety procedures when working on small engines, i.e. clutches disengaged, spark plug wire unhooked from spark plug.
10. identify type of carburetors.
11. adjust carburetor.
12. know of procedures for storage of this type of engine.
13. understand the importance of proper lubrication.
14. understand the importance of keeping engines clean.
15. use tools properly.

CONTENT:

- I. Safety
    - A. safe use of cleaning solvents
    - B. safe handling of flammable materials - gasoline
    - C. disconnect the spark plug wires
    - D. clamping engine to bench or use of engine stand
    - E. proper use of tools, testing equipment
- II. Principles of operation
    - A. compression

   - B. ignition
   - C. carburetion

III. Use of reference information

   - A. read and use parts manual
   - B. operate microfilm reader
   - C. use operator's manual
   - D. use service manual

IV. Ingition systems

   - A. replace spark plug
   - B. clean spark plug
   - C. gap or regap spark plug
   - D. replace breaker points
   - E. gap or regap breaker points
   - F. test condenser
   - G. replace condenser
   - H. test coil
   - I. replace coil (if necessary)
   - J. adjust air gap
   - K. inspect key way and key for wear

V. Compression

   - A. check for reason of low compression
   - B. clean head
   - C. torque head bolts
   - D. replace gasket (head).
   - E. inspect valves for opening and closing

VI. Carburetion

   - A. types of carburetors
   - B. clean carburetor
   - C. check choke
   - D. made adjustments
   - E. check for air leaks
   - F. function of air cleaner
   - G. clean air cleaner
   - H. check linkages

VII. Storage of engine

   - A. remove all fuel from tank
   - B. change oil
   - C. clean air cleaner
   - D. lubricate cylinder

TEACHER ACTIVITIES:

1. Use lecture to go over safety rules and procedures.

2. Demonstrate safety steps.

3. Show students using examples of causes of improper maintenance.

4. Demonstrate to students:

    A. changing spark plug.
    B. regapping spark plug.
    C. inspection of wires.
    D. test coil.
    E. test condenser.
    F. installation of breaker points.
    G. adjustment of carburetors.
    H. clean air cleaner.

5. Show how to use reference.

STUDENT ACTIVITIES:

1. Students will be given problems and use reference order parts for engines.

2. Service the following areas:

    A. ignition system
    B. carburetion system

3. Inspect and clean engine.

4. Prepare an engine for storage.

EVALUATION:

1. Check students' work:

    A. spark plug gap.
    B. armature air gap.
    C. all setting.

2. Test and quizzes.

3. Evaluate students' success of:

    A. correct parts ordered.
    B. correct starting and operating of engine.

RESOURCES:

1. Service manuals for types of engines to be worked on.

2. Engines.

3. Parts.

4. Lubricates, cleaning solvents.

5. Testing equipment.

6. Tools, small engines.

7. Special tools.

8. Engine stands.

9. Microfilm reader and microfilm.

BIBLIOGRAPHY:

1. Briggs and Stratton Repair Instruction IV, Milwaukee, Wisconsin, Briggs and Stratton Corp.

2. General Theories of Operation, Milwaukee, Wisconsin, Briggs and Stratton Corp.

3. Briggs and Stratton Parts Manual, Milwaukee, Wisconsin, Briggs and Stratton Corp.

4. Tecumseh Parts Manual, Lauson, Tecumseh Corporation, Grafton, Wisconsin.

5. Mechanics Handbook, Lauson, Tecumseh Corporation, Grafton, Wisconsin.

6. Gray, James A., and Barrows, Richard, Small Gas Engines, Prentice-Hall, Englewood, N.J., 1976.

MEDIA:

1. Overhead transparent working models.

2. Briggs and Stratton small engine charts.

3. Briggs and Stratton slides:

    A. Aluminum engine overhaul
    B. Start-stop and store
    C. Engine check-up
    D. Valves and seats
    E. Resizing cylinders
    F. Bearing replacement

4. Ignition working model.

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Tractor Driving

LENGTH: 3 Weeks

WHEN TAUGHT: Grades 9, 10.

OBJECTIVES: The students will be able to:

1. check liquid level in radiator, oil level in crank case, fuel level, liquid in battery, and all gauges.

2. safely start tractor.

3. safely drive tractor with an attached implement, such as a manure spreader.

4. know safety precautions.

5. know hand signals related to safe tractor operation.

6. know tractor signals.

CONTENT:

I. Safety

- A. cause of most accidents
- B. no extra riders
- C. area properly cleared to operate tractor in
- D. carbon monoxide poisoning
- E. power take off
- F. roll over protection and seat belts

II. Starting the tractor

- A. check tires for inflations, cuts, etc.
- B. check liquid in radiator
- C. check oil level in crank case
- D. check fuel amount
- E. check battery liquid level
- F. check seat adjustment, seat belt
- G. check dash gauges
- H. turn on glow plug
- I. check brakes
- J. put tractor in neutral
- K. depress clutch
- L. adjust throttle to ¼ open
- M. turn key to on and release when tractor starts

III. Practice driving - tractor

- A. with clutch depressed, put tractor in forward gear
- B. adjust throttle of engine to approximately 1000 RPM
- C. let out clutch slowly

  - D. as tractor starts to moves, remove foot from brake
  - E. drive forward, stop
  - F. reverse, stops
  - G. park, neutral, parking brake on, return throttle lever, shut off

IV. Practice driving - 2-wheel wagon

  - A. spotting
  - B. drive through figure eight course
  - C. back in alley

TEACHER ACTIVITIES:

1. Use lecture and discussion periods to:
   - A. acquaint students with tractor safety.
   - B. show films on tractor safety.
   - C. acquaint students with proper driving techniques.
2. Demonstrate inspection, starting, and driving.
3. Observe students driving.
4. Provide lab sheets, references, and evaluation material to accomplish objectives.

STUDENT ACTIVITIES:

1. Maintain notebook on lecture and discussion.
2. Complete lab sheets.
3. Start, drive and stop tractor.
4. Attach equipment.

EVALUATION:

1. Quizzes and written test on all material.
2. Driving skill test.

RESOURCES:

1. Tractor
2. Reference material

BIBLIOGRAPHY:

1. 4-H Tractor Care and Safety Program, U.S. Government Printing Office, 1973.

2. Eastern States, FFA Tractor Contest Course Score Sheets.

3. Operating Farm Tractors and Machinery, Wardle, Norman J., Iowa State University, Cooperative Extension Service, Ames, Iowa, 1969.

4. Silleto, Thomas A., and Hall, Dale O., Safe Operation of Agricultural Equipment, Hobar Publications, St. Paul, MN.

MEDIA:

1. Roll-Gard, John Deere

2. Tractor Safety, Ford

3. Overhead transparencies, John Deere

ANIMAL SCIENCE CURRICULUM

UNIT: Animal Health

LENGTH: 3 weeks

WHEN TAUGHT: Grades 9 or 10, fall or spring

OBJECTIVES: The student will be able to:

1. recognize common health problems of animal.
2. develop basic skills in detecting common health problems in animals.
3. develop reasonable skills in the area of animal restraint.
4. understand the basic principles of disease prevention and it's control.
5. understand the basics of administration of medication and caring for animals.
6. be acquainted with opportunities in the animal health profession.

CONTENT:

I. Normal Animal
   - A. animal attitude and behavior
   - B. body temperature, pulse and respiration

II. Animal Restraint
   - A. restraint of dogs, cats, and small animals
   - B. restraint of sheep, goats and swine
   - C. restraint of horses and cattle

III. Maintaining Animal Health
   - A. preventive programs
   - B. housing & pasture care
   - C. vaccinations and wormings
   - D. cleaning, disinfection, sanitation
   - E. insect control

IV. Animal First Aid
   - A. treating bleeding
   - B. treating puncture wounds
   - C. treating cuts and abrasions
   - D. treating burns
   - E. treating hypothermia and hyperthermia
   - F. treating sprains and swellings

G. basic bandaging
H. treating digestive problem - bloats, colic
I. treating mammary inflamation

V. Animal Disease

A. introduction to disease - definitions
B. types of disease

1. bacterial
2. viral
3. external and internal parasites
4. nutritional
5. genetic
6. plant poisonings
7. problems of parturition

VI. Methods of administration of medication or treatment

A. orally - drenching, balling gun, tubing
B. per rectum
C. dermal
D. injections

1. intramuscular
2. intravenous
3. sub cutaneous
4. intrammary
5. intra rumen

E. floating teeth

VII. Disease Detection

A. law of comparison
B. any deviation from normal
C. fecal examination
D. microscopic examination of blood, urine and material of infected area
E. CMT mastitis test

VIII. Parasites

A. identification of common external & internal parasites
B. parasite detection
C. control and treatment

TEACHER ACTIVITIES:

1. Use lecture periods to explain the principals of disease and it's control.

2. Demonstrate proper procedure in the administration of medication.

3. Demonstrate various restraints used in caring and treating farm animals.

4. Demonstrate various lab tests used in detecting health problems.
5. Plan field trips.

STUDENT ACTIVITIES:

1. Maintain notebooks on lecture and discussion sessions.
2. Maintain health records on school animal.
3. Answer study questions on each assignment.
4. Practice restraint on his own or school animals.
5. Check his own animals for health problems - fecal examination, etc.
6. Administrate medication to their animals.

EVALUATION:

1. Review notebooks
2. Administration of tests and quizzes
3. Have students demonstrate laboratory techniques.
4. Review students health records on school and own animals.

RESOURCES:

1. State Veterinarian
2. Local extension service office for publications relating to animal health.
3. Local veterinarian
4. Local trainers, shepherds and herdsmen for basic techniques.

BIBLIOGRAPHY:

1. Bailey, J.W., Veterinary Handbook for Cattlemen, Springer Publishing Co. 1963, New York, N.Y.
2. Catcott, Earl J., Animal Hospital Technology, American Veterinary Publication, Inc. Wheaton, Illinois, 1971
3. Dykstra, R.R., Animal Sanitation and Disease Control, Interstate Publications, Danville, Ill., 1955
4. Leahy, John R., Restraint of Animals, Cornell Campus Store, Inc., Ithaca, N.Y. 1953

5. Schied, Dan W., Livestock Veterinary Health Service, Highsmith Co., Inc., Fort Atkinson, Wisconsin, 1976 53538

6. Siegmund, O.H. ,The Merck Veterinary Manual, Merck & Co., Inc., Rahway, N.J., 1973

7. Ailments, Farming Press LTD, Fenton House Wharfedale Road, Ipswich Suffolk England 1976

8. Animal Diseases, 1956 United States Department of Agriculture, Yearbook of Agriculture, U.S. Government Printing Office, Washington, D.C.

9. Animal Disease, 4H Veterinary Science Program, Cooperative Extension Pub. 1971

10. Herd Health Guide, W.D. Hoard & Sons Co., Fort Atkinson, Wisconsin, 1976

11. Horse Science, 4H Horse Program Cooperative Extension, Pub. 1971

12. The Normal Animal, 4H Veterinary Science Program, Cooperative Extension Pub. 1971

13. TV Vet Book for Stock Farmers #2 Calving the Cow and Care of the Calf, Farming Press LTD, Fenton House Wharfedale Road, Ipswich Suffolk England, 1972

14. TV Vet Book for Pig Farmers How to recognize and treat Common Pig Ailments, Farming Press LTD, Fenton House Wharfedale Road, Ipswich Suffolk England, 1973

15. TV Vet Horse Book, Recognition and Treatment of Common Horse and Pony Ailments, Farming Press LTD, Fenton House Wharfedale Road, Ipswich Suffolk England, 1976

MEDIA:

1. ______________________________

2. ______________________________

3. ______________________________

4. ______________________________

ANIMAL SCIENCE CURRICULUM

UNIT: Animal Housing

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9

OBJECTIVES: The student will be able to:

1. identify the major areas which must be considered in housing livestock.

2. know specific conditions or environmental factors which result in healthy productive livestock.

CONTENT:

I. Planning the facilities

   A. designs and location
   B. type of housing

II. Space per animal

III. Environmental controls

   A. ventilation
   B. heat
   C. light
   D. humidity

IV. Special requirements

   A. hospital
   B. maternity
   C. storage
   D. handling

TEACHER ACTIVITIES:

1. Conduct a pretest.

2. Arrange for field trips.

3. Lead class discussion on arrangements.

STUDENT ACTIVITIES:

1. Maintain a notebook.

2. Write answer study questions.

3. Survey housing facilities.

4. Design ideal facilities for their elected livestock.

(Student Activites Con't.)

5. Students will participate in class discussion.

6. Reading reports.

EVALUATION:

1. Notebooks
2. Quizzes
3. Field trip write-ups and other homework
4. Class discussion
5. Project - content and quality

RESOURCES:

1. Local livestock farms
2. Magazines

BIBLIOGRAPHY:

1. Ensminger, M.E. The Stockman's Handbook, Interstate, 1970.

MEDIA:

1. ______________________________

2. ______________________________

ANIMAL SCIENCE CURRICULM

UNIT: Animal Nutrition

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 10

OBJECTIVES: The student will be able to:

1. develop a knowledge of the anatomy of animal digestive systems.
2. develop a knowledge of how digestive systems function.
3. understand principles of food digestion, nutrient absorption and metabolism.
4. identify nutrient requirements of animals.
5. identify common feeds and feed stuffs.
6. develop feeding programs for animals.

CONTENT:

I. Types of digestive systems
   A. simple
   B. simple with enlarged colon
   C. simple with cecum
   D. ruminant
   E. gizzard

II. Digestion
   A. enzymatic
   B. enzymatic and bacterial
   C. bacterial and enzymatic

III. Feeds, stuff composition
   A. carbohydrates
   B. proteins
   C. fats
   D. minerals and vitamins

IV. Absorption and metabolism
   A. water
   B. nutrient conversion to energy
   C. nutrient storage
   D. waste elimination

V. Developing feeding programs
   A. nutritional requirements
   B. matching needs and sources of nutrition
   C. recognizing nutritional deficiencies

TEACHER ACTIVITIES:

1. Lecture sessions to explain degestive systems and their functions.
2. Develop or secure charts and models of digestive systems.
3. Secure examples of real digestive tracts.
4. Set up feeding demonstration with small animals or poultry.
5. Arrange field trip to demontrate feeding program.
6. Secure examples of feeding programs, feed tags, and feed stuffs.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture sessions.
2. Secure feed tags.
3. Work with laboratory animals or birds.
4. Develop feeding program for at least one specie of animal.

EVALUATION:

1. Review notebooks periodically.
2. Administer quizzes appropriate to areas covered.
3. Use field trip evaluation checklist.
4. Evaluate student laboratory projects.
5. Score feeding program developed by students.
6. Use post-test.

RESOURCES:

1. Models - NASCO, Madison, Wisconsin, and other supply houses.
2. Feed Company - Service Specialist
3. University of Connecticut Extension Service Specialist.
4. Slaughter Houses.

BIBLIOGRAPHY:

1. Cullison, A.E., Feeds and Feeding, Prentice-Hall Co., 1979.
2. Ensminger, E.M., Feeds and Nutritions, 1979.
3. Fridline, C.R., Livestock Nutrition and Feeding, Ohio State University, 1979.

4. Gassard and Juergenson, Approved Practices in Feeds and Feeding, Interstate Printers and Publishers, 1971.

5. Jurgens, M.H., Animal Feeding and Nutrition, Kendall/Hunt Publishing Co., 1978.

MEDIA:

1. Film "The Ruman Story", Purina Company.

ANIMAL SCIENCE CURRICULUM

UNIT: Animal Selection

LENGTH: 3 weeks

WHEN TAUGHT: Grade 9 or 10

OBJECTIVES: The student will be able to:

1. recognize common breeds of dairy, beef, horses, sheep, poultry, and swine.
2. recognize external body parts of animals and the related terminology in animal science.
3. understand basic skills of judging animals.
4. apply principles of animal selection as they relate to keeping animals for fun or for profit.

CONTENT:

- I. Identification of Breeds
    - A. dairy
    - B. beef
    - C. sheep
    - D. swine
    - E. goats
    - F. horses
    - G. poultry
- II. Parts of the live animal
    - A. cattle
        - 1. dairy
        - 2. beef
    - B. swine
    - C. sheep & goat
    - D. horse
    - E. poultry
- III. Terms and Judging
    - A. use one class of livestock
        - 1. terms for judging
        - 2. judge class writing reasons
        - 3. explain reasons format
        - 4. evaluate pedigrees and records

TEACHER ACTIVITIES:

1. Develop sets of Flash Cards.

2. Procure animal models for class demonstration.
3. Prepare work sheets for Breeds, Body Parts, and terminology.
4. Arrange field trips for judging and related terminology.
5. Give class lectures and demonstrations.

STUDENT ACTIVITIES:

1. Keep notebook of hand-out materials and class notes.
2. Judge classes of live stock and present reasons to fellow class members.
3. Secure animal pedigrees and production records for evaluation.

EVALUATION:

1. Review notebooks.
2. Quizes and tests.
3. Score on judging and giving of reasons.

RESOURCES:

1. Slide sets and pictures.
2. Breed association publications.
3. Local farms and student projects.
4. Movies available from breed associations.
5. Animal shows and fairs.
6. Qualified persons who judge.

BIBLIOGRAPHY:

1. Bundy and Diggins, Livestock and Poultry Production, Englewood Cliffs, New Jersey, Prentice Hall, Inc., 1968
2. Ensminger, M.E., The Stockmans Handbook, Danville Illinois: The Interstate Printers and Publishers, Inc., 1970
3. LSU Cooperative Extension Service, All About Animals, Bulletin 1440, Louisiana State University and Agricultural
4. Seiden, R.D., Livestock Health Encyclopedia, New York NY, Springer Publishing Co., Inc., 1968

5. Ulmer, Donald E., and Elwood M. Juergenson, Approved Practices in Raising and Handling Horses, Danville Illinois, The Interstate Printers and Publishers, Inc. 1974

6. Doans Farm Management Guide, St. Louis, Missouri, 1971

MEDIA:

1. ______________________________

2. ______________________________

3. ______________________________

ANIMAL SCIENCE CURRICULUM

UNIT: Forage Crops

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 10, Spring or Fall

OBJECTIVES: The student will be able to:

1. develop knowledge and skills necessary for growing different forage grasses and legumes that are economically important.
2. plan and develop and maintain a total forage program.
3. develop the knowledge and skills related to harvest, harvest methods and storage of the various forage crops.
4. identify weeds and other pests, and their control.
5. check yields and analyze forage.

CONTENT:

I. Importance of forage crops
   - A. relationship to other animal feeds
   - B. use in livestock programs
   - C. benefits derived from fprages

II. Growing forage crops
   - A. legumes (e.g. alfalfa, red clover, birds foot trefoil and ladino clover)
     1. importance
     2. characteristics
     3. identification
     4. cultural practices
   - B. grasses (e.g. corn, brome grass, timothy, reeds canary, orchard grass, Kentucky blue grass, and ryegrass)
     1. importance
     2. characteristics
     3. identification
     4. cultural practices

III. Harvesting and storing forages
   - A. hay
   - B. silage
   - C. pastures

IV. Forage management program
   - A. total farm plan

B. maintaining the forage program
C. soil, fertility and conservation
D. pest control

TEACHER ACTIVITIES:

1. Collect samples of forages for identification.

2. Lecture periods.

3. Text readings.

4. Field trips to area farms to see cultural practices and harvesting.

STUDENT ACTIVITIES:

1. Make charts including:

   A. legume, grasses
   B. palatibility
   C. soil adaptation
   D. fertilization
   E. strong points
   F. weak points

2. Maintenance, check and adjustment of spraying equipment.

3. Class discussion of legume inoculation.

4. Plant varieties of grasses and legumes.

5. Collect data from local farms: (obtain samples for laboratory analysis at the Connecticut Agriculture Experiment Station, New Haven)

   A. crops
   B. acreage
   C. yield
   D. varieties
   E. harvesting methods
   F. storage

6. Discussion of net energy and digestible protein as criteria for comparing value of forages.

7. Prepare and send samples of forages to Connecticut Agricultural Experiment Stattion for analysis.

8. Compute net returns per acre using low yielding and high yielding fields.

9. Prepare a forage plan for farming program or case farm using animal unit base for pasture, silage and hay.

10. Practice grading and identifying samples of hay and silage.
11. Assemble and construct demonstrations for forage conservation practices.

EVALUATION:

1. Written and oral quizzes.
2. Practical demonstrations.
3. Unit assignments (e.g. homework, field trip assignments).
4. Unit exam.
5. Attitudes, interest, group activity, and participation should also be evaluated.

RESOURCES:

1. Local farms.
2. Experiment stations.
3. Greenhouse.
4. Seeds and plant samples.

BIBLIOGRAPHY:

1. Aldrich, S.R. and Levg, E.R., Modern Corn Production, "Farm Quality", Cincinatti, Ohio, 1966.
2. Delorit, R.J. and Ahlgren, H.L., Crop Production, 3rd ed., Prentice-Hall, Inc., Englewood Cliffs, N.J., 1967.
3. Huges, H.D., Heath, M.E., Metcalf, D.S., Forages, Iowa State University Press, Ames, Iowa, 1953.
4. Huges, H.D. and Henson, E.R., Crop Production, Macmillan Co., New York, N.Y., 1954.
5. Webster, H.K. Co. The Science of Dairy Production, H.K. Webster Co., Lawrence, Mass.
6. Wilson, H.K., and Richer, A.C.; Producing Farm Crops, Interstate Printers and Publishers, Danville, IL, 1966.
7. Washko, W.W., Corn Production for Silage in Connecticut, University of Connecticut Extension Service, Storrs, CT, 1969.

MEDIA:

1. ______________________________
2. ______________________________

NATURAL RESOURCES CURRICULUM

UNIT: Conservation of Natural Resources

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9 or 10, Fall or Spring

OBJECTIVES: The student will be able to:

1. define and give three examples of each of these terms: conservation, preservation, utilization, renewable natural resources, non-renewable natural resources and natural resources.
2. explain what is meant by "resource management".
3. describe the duties of three career positions in natural resources conservation.
4. explain what soil is and how it is formed.
5. name the three major plant nutrients and tell how they can be put back when used up.
6. define soil erosion, and the agents that cause it.
7. draw and explain the hydrologic cycle.
8. explain what a water shed is; outline a local watershed.
9. define the term wetland and explain its valuable functions.

CONTENT:

I. Identifying natural resources

    A. renewable natural resources
    B. non-renewable natural resources

II. Protecting our natural resources

    A. conservation (wise utilization) of resources
    B. preservation of resources
    C. managing natural resources

III. Identifying soil forming factors

    A. parent material
    B. topography
    C. climate
    D. biotic factors
    E. time

IV. Physical, chemical and biological properties of soil

    A. texture
    B. structure
    C. soil water
    D. organic matter

   - E. soil organisms

V. Soil erosion

   - A. agents causing erosion
   - B. types of erosion
   - C. erosion control

VI. Identifying the hydrologic cycle processes

   - A. precipitation
   - B. transpiration
   - C. evaporation
   - D. condensation
   - E. percolation

VII. Determining watershed properties

   - A. groundwater supplies
   - B. surface water
   - C. wetlands
   - D. effects of vegetation on water runoff

VIII. Determining water quality

   - A. water pollution
      1. identifying sources of water pollution
      2. identifying effects of water pollution on the total environment
      3. function of wetlands in controlling pollution
      4. mechanical and chemical means of controlling pollution
   - B. water testing
   - C. water treatment
      1. biological oxygen demand
      2. dissolved oxygen
      3. waste water treatment

IX. Assessing job opportunities available in natural resources

   - A. assessing competencies needed for entry level positions
   - B. determining educational requirements necessary for employment
   - C. determining availability of positions

TEACHER ACTIVITIES:

1. Arrange field trips to areas displaying good and poor erosion control practices.

2. Contact resource persons such as soil conservation, forestry and/or water treatment personnel to speak to class concerning career opportunities.

3. Arrange a field trip to local water treatment facilities.

4. Contact county soil scientist to organize a field trip to observe soil and water conservation practices.

5. Have soil pits and/or soil samples available for students to observe soil horizons, texture and permeability.

STUDENT ACTIVITIES:

1. Define and list at least three renewable natural resources and three non-renewable natural resources.

2. Explain how conservation of natural resources differs from preservation. Site samples.

3. Identify the soil horizons in a soil pit or on a drawing.

4. Visit sites exhibiting different types of erosion. Describe and compare.

5. Take a tour of areas exhibiting soil conservation practices with the county soil scientist.

6. Visit local watershed and later map the watershed area.

7. Explain why all people living in a particular watershed should be concerned about land and water use in it.

8. Make a drawing of the water cycle.

9. Demonstrate at least two of the following actions of water with respect to soil: percolation, capillary action, precipitation, evaporation, and transpiration.

10. Take a field trip to a local water treatment facility.

11. Make a sketch to show the course of home water supply from watershed to tap and on to receiving stream (include passage through waste-treatment facilities)

12. Describe the duties of three careers in natural resources conservation.

EVALUATION:

1. Have the students define and give three examples of the following terms: natural resources, renewable resources, non-renewable resources, conservation, preservation utilization and resource management.

2. The student should explain the purposes and effects of the soil conservation practices observed.

3. The student should be able to name and describe the three types of soil erosion: sheet, gulley and rill.

4. Have each student draw the hydrologic cycle and explain its importance.

5. After visiting a local watershed, have students map and label the area.

6. Each student should sketch the course of water flow to and from his/her home, beginning with the watershed and ending with passage through a waste-water treatment facility.

RESOURCES:

1. Local water treatment plant operators.

2. Soil Conservation Service personnel.

3. Backhoe might be needed for digging pits.

4. Soil and/or water testing kits.

BIBLIOGRAPHY:

1. A Connecticut Soils Primer, no. 6691, Connecticut Cooperative Extension Service, Storrs, CT.

2. A Connecticut Water Primer, Connecticut Cooperative Extension Service.

3. Amos, William H., "Limnology: An Introduction to the Freshwater Environment", 40 pages, from Forestry Suppliers, Inc., Jackson, Miss.

4. A Primer on Ground Water, U.S. Government Printing Office, Washington, D.C., 1970.

5. Kircher, H.B. and P.E. McNall, Our Natural Resources, 4th ed., Interstate Printers and Publishers.

6. Renn, Dr. Charles E., A Study of Water Quality, LaMolte Chemical Products Company, Chestertown, Maryland 21620, 1968.

MEDIA:

1. "Soil: Its Meaning For Man", Parts 1 and 2, available from Prentice-Hall Media, Tarrytown, NY.

2. "Land: Its Uses and Values", available from Prentice-Hall Media, Tarrytown, NY.

3. Filmstrip "Soil and the Agricultural Environment", available from NASCO, Fort Atkinson, Wisconsin 53538.

4. Slides or filmstrip, "Pollution, Garbage, Junk, and Man", available from NASCO, Fort Atkinson, Wisconsin, 53538.

5. Transparencies "Small Watershed Management", from Photocom Productions, Pismo Beach, California.

6. "Soils" overhead transparencies, Vocational Education Productions, Cal-poly.

7. Filmstrip "Careers in Agricultural Resources".

NATURAL RESOURCES CURRICULUM

UNIT: Forestry and Wildlife Management

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9 or 10, anytime

OBJECTIVES: The student will be able to:

1. describe the value of forests as recreational areas and in protecting soils, water resources and wildlife habitat.
2. test the products that we use daily that come from the forest.
3. explain the process of photosynthesis and how a tree grows.
4. identify and describe the functions of phloem, xylem, heartwood, cambium, outer bark.
5. define: hardwood, softwood, coniferous and deciduous.
6. define: board foot, cubic foot, cord, face cord and long cord and be able to use each when buying or selling firewood.
7. describe three occupational opportunities in the forest industry.
8. describe the damage to forests and watersheds by insects, diseases, fire, overgrazing, and unwise cutting practices and tell what is being done to reduce or control the damage.
9. identify five native species of fish and five species of wildlife.
10. describe the three welfare factors (food, cover and water) and how they effect wildlife populations.
11. describe five different relationships between man and fish and wildlife.
12. name three local plants useful as wildlife food and name three others useful as wildlife cover.
13. explain: carrying capacity, food web, food chain, consumer, producer, herbivore, carnivore, omnivore, decomposer, plant succession.
14. define fish and wildlife management and tell why it is necessary.

CONTENT:

I. Identifying the values of a forest

   A. recreation
   B. protection of soil and water resources
   C. wildlife habitat
   D. forest products

II. Describing how a tree grows

   A. parts of a tree

      1. crown
      2. trunk
      3. roots
      4. cambium
      5. bark
      6. xylem
      7. phloem
      8. heartwood

   B. photosynthesis

III. Identifying different types of trees

   A. deciduous
   B. coniferous

IV. Identifying damage to trees and their effects

   A. insects
   B. overgrazing
   C. diseases
   D. fire
   E. poor cutting practices

V. Measuring wood

   A. board foot
   B. cubic foot
   C. cord
   D. face cord
   E. long cord

VI. Identifying fish and wildlife species native to Connecticut

   A. fish
   B. mammals
   C. birds

VII. Identifying the needs of wildlife

   A. food

      1. herbivore
      2. carnivore
      3. omnivore
      4. consumer
      5. food chains and food webs

   B. cover
   C. water

VIII. Managing wildlife

- A. identifying problems
- B. carrying capacity
- C. population dynamics

TEACHER ACTIVITIES:

1. Arrange field trips to forest and wildlife management areas.

2. Arrange to have forester, wildlife biologist and/or conservation officer speak with class on field trip.

3. Cut a tree cross section for use by class in identifying parts of trunk.

STUDENT ACTIVITIES:

1. Tell the difference between deciduous and coniferous tree species.

2. Trace out the steps in plant succession in an abandoned field.

3. Take a field trip to a forest management area, discuss needs and procedures with service forester.

4. Identify the parts of a tree trunk from diagrams and trunk sample.

5. List items used daily that are derived from the forest.

6. Measure a cord of wood, a face cord and a long cord.

7. Describe those factors that cause damage in the forest.

8. Identify assigned species of fish and wildlife from mounts, pictures, posters, slides and filmstrips.

9. Report on two species of wildlife. Tell what they require for food and cover, when their mating seasons occur and if they migrate or hibernate in the winter.

10. Describe five different relationships between man and wildlife. Use examples of desirable and undesirable relationships.

11. Describe the following, include examples where necessary: carnivore, herbivore, omnivore, carrying capacity, consumer, producer, decomposer.

12. Draw a food chain for one of these areas: abandoned field, freshwater pond, salt marsh and deciduous forest.

EVALUATION:

1. Students will each draw and label a food chain.

2. Report on two wildlife species.

3. Describe the "steps" in plant succession and how succession effects wildlife.
4. Identify the parts of a tree.
5. Describe forest management practices.

RESOURCES:

1. Local service forester.
2. Soil Conservation Service.
3. Department of Environmental Protection.
4. Wildlife biologist or conservation officer.
5. Firewood to place in cords, etc. for identification; measurements by students.

BIBLIOGRAPHY:

1. Forbes, Reginald D., Forestry Handbook, Ronald Press, 1955.
2. Forestry, Merit Badge Series, 1976, Boy Scouts of America, North Brunswick, New Jersey.
3. Game Gunners and Biology, Olin-Winchester Company.
4. Kircher, H.B., and P.E. McNall, Our Natural Resources, 4th ed., Interstate Printers and Publishers.
5. Management of Forest Resources for Multiple Use, University Park, Penn. Department of Agricultural Education, The Pennsylvania State University, 1970, 124 pages.

MEDIA:

1. "The Deciduous Forest", 2 part filmstrip available from Prentice-Hall Media, Tarrytown, New York.
2. "Managing Wildlife: Is It For You?" filmstrip available from Vocational Education Productions.
3. "The Forest" filmstrip available from NASCO.
4. "Protecting Forests From Insects and Disease" filmstrip available from NASCO.

NATURAL RESOURCES CURRICULUM

UNIT: Outdoor Safety

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9 or 10, Fall, Winter or Spring.

OBJECTIVES: The student will be able to:

1. explain what first aid is and the importance of first aid training.
2. recognize situations in which accidents and/or injuries are more likely to occur.
3. identify the practices that can discourage the occurance of accidents and injuries.
4. recognize signs and symptoms of the following situations and use acceptaed first aid techniques in their treatment with competency indicated in the Standard First Aid and Personal Safety by the American Red Cross: treating wounds, specific injuries, shock, administering artificial respiration and cardio pulmonary resusitation, treating for swallowed objects and choking, treating poisoning, burns, frostbite and cold exposure, heat stroke, heat cramps, heat exhaustion, treatment for sprains and fractures, poisonous bites and plant poisoning, emergency rescue and short distance transfer.

CONTENT:

I. Introduction to first aid

   A. definition
   B. reasons for first aid
   C. value of first aid training

II. Wounds

   A. definition
   B. common causes
   C. symptoms of open and closed wound
   D. first aid for open and closed wounds
   E. first aid for severe bleeding
   F. prevention of contamination and infection
   G. bites
   H. prevention of wound causing accidents

III. Specific injuries

   A. eye
   B. head
   C. neck
   D. chest
   E. abdomen
   F. back
   G. genital organs
   H. legs and feet
   I. hands

IV. Shock

- A. definition
- B. causes
- C. signs and symptoms
- D. treatment objectives
- E. first aid

V. Respiratory emergencies and artificial respiration

- A. definitions
- B. causes of respiratory and cardiac failure
- C. the breathing and circulation process
- D. artificial respiration
- E. cardio pulmonary resuscitation
- F. prevention of respiratory accidents
- G. swimming safety tips
- H. boating safety tips

VI. Swallowed objects and choking

- A. causes of choking
- B. signs and symptoms
- C. first aid
- D. prevention

VII. Poisoning

- A. definition
- B. causes
- C. signs and symptoms
- D. objectives in treatment
- E. first aid
- F. prevention of accidental poisoning
- G. poisoning by marine life
- H. poisonous insect bites
- I. poisonous snake bites

VIII. Drugs and their abuse

- A. definition
- B. identification of drug abuse
- C. classification of drugs

IX. Burns

- A. definition
- B. causes and effects
- C. classification
- D. first aid
- E. prevention of burns

X. Frostbite and cold exposure

- A. frostnip

- B. frostbite
- C. hypothermia
- D. prevention of injuries from extreme cold

XI. Heat stroke, heat cramps, and heat exhaustion

- A. definition
- B. causes
- C. heat stroke
- D. heat cramps
- E. heat exhaustion

XII. Sudden illness

- A. heart attack
- B. stroke
- C. fainting
- D. convulsion
- E. epilepsy
- F. prevention of heart attack and apoplexy

XIII. Dressing and bandages

- A. dressings
- B. bandages
- C. first aid kits and supplies

XIV. Bone and joint injuries

- A. definitions
- B. types of fractures
- C. dislocation
- D. sprains
- E. strains
- F. prevention of accidents resulting in bone and muscle injuries

XV. Emergency rescue and short distance transfer

- A. definition of emergency rescue
- B. indications for immediate rescue
- C. methods of transfer

TEACHER ACTIVITES:

1. Arrange field trips or guest speakers to discuss the importance of first aid training in their occupations.

2. Arrange for a field trip to a local ambulatory care center emergency room or poison control center.

3. Provide simulated situations for students to apply first aid techniques.

4. Instruct students in Standard First Aid and certify qualified individuals.

5. Arrange for local emergency service personnel to demonstrate first aid equipment, supplies and techniques.

STUDENT ACTIVITIES:

1. Set up simulated wounds using students as patients and have others administer first aid techniques.

2. Prepare a bulletin board showing poisonous and non-poisonous snakes, spiders, insects and plants common to the area.

3. Find the names and addresses of area emergency services, poison treatment centers, etc.

4. Practice artificial respiration and cardio pulmonary resusitation on resusci-annie.

EVALUATION:

1. Have the students list five agricultural resources occupations and at least four first aid requirements for each occupation.

2. Have each student demonstrate at least four first aid skills assigned by the instructor. Evaluate the students as to correctness of procedure.

3. Have certified Red Cross instructor give test for certification in CPR and/or Standard First Aid.

RESOURCES:

1. First Aid kits.

2. Snake bite kits.

3. Local first aid instructors and emergency medical personnel.

BIBLIOGRAPHY:

1. Emergency Care, Harvey Grant and Robert Murray.

2. Standard First Aid and Personal Safety, The American Red Cross.

MRDIA:

1. Choking, A First Aid Film, American Educational Films.
2. A Life in Your Hands, West Glen Films.
3. The New Pulse of Life, Pyramid Films.
4. First Aid Series, McGraw-Hill:
    - Introduction to First Aid
    - Severe Bleeding
    - Stopped Breathing
    - Internal Poisoning
5. By Natures Rules, A Film on Hypothermia, Jim Lawless Motion Picture Consultants, Inc. 1545 N.E. 130th Street, Seattle, WA.

PLANT SCIENCE CURRICULUM

UNIT: Agricultural Pest Control

LENGTH: 3 weeks

WHEN TAUGHT: Grade 9 or 10, anytime

OBJECTIVES: The student will be able to:

1. safely and correctly apply pesticides.
2. pass the examination for the operators license from the state.
3. assess and make recommendations dealing with specific pest control.

CONTENT:

I. Career Opportunities

II. Reasons for learning about pesticide

   A. laws and certification

III. Toxicity of Pesticides

   A. kinds
   B. labeling
   C. first aid

IV. Ecology and Environment

   A. protection
   B. food chain

V. Safety

   A. equipment
   B. storage
   C. mixing
   D. application
   E. disposal

VI. Types of Pesticides

VII. Application

   A. the label
   B. formulations
   C. calculations
   D. equipment
   E. records

VIII. Liability

TEACHER ACTIVITIES:

1. Provide workboods and assignments.
2. Provide materials for preserving, mounting, and labeling pests.
3. Provide texts for identification of pests.
4. Provide examples of pests for identification and testing.
5. Demonstrate proper use of pesticide application and safety equipment.
6. Provide chemicals for examples of labels and materials.

STUDENT ACTIVITIES:

1. Complete workbooks and assignments.
2. Identification of common insect disease, weed, and animal pests.
3. Calibrate and adjust hydraulic sprayer, shop spreader and/or cyclone type spreader.
4. Apply pesticides.
5. Neutralize or clean out sprayers.
6. Collect, and properly preserve, label, identify, pest specimens.

EVALUATION:

1. Multiple choice and short answer test on factual information.
2. ID test on pests.
3. Observation of safety procedures used by the students.
4. Student's collection.
5. Grade on operator's license test.

BIBLIOGRAPHY:

1. Colvin, T.S., Turner, F.H., Applying Pesticides, Text, workbook, slides, American Association for Vocational Instructional materials
2. Metcalf, C.L., Flint, W.P., Destructive and Useful Insects, McGraw-Hill, New York City, NY
3. Pirone, P.P., Diseases and Pest of Ornamental Plants, Ronald Press, New York City, NY

4. Farm Chemical Handbook, Meister Publishing Company, 1980
5. How to Collect, Preserve and Identify Insects, Ext. Circ. 509, Coop Extension Service, Purdue University, Lafayette, Indiana
6. Insects, Y B of Agriculture, 1952
7. Pesticide Applicator Training Manual, Cornell Univ., 1980
8. Principles of Pesticide Use, Handling & Application, EPA, 1976
9. Selected Weeds of the United States, Agriculture Handbook #366, Agr. Res. Service, USDA Supt. of Documents, U.S. Government Printing Office, Washington, DC

MEDIA:

1. Diseases of Garden Flowers - Filmstrip - NASCO
2. Diseases of Horticultural Crops - Trees, Turfwood - 122 Slides, NASCO
3. Diseases of the Vegetable Garden - Filmstrip - NASCO
4. Controlling Pests of Ornamental Plants - Filmstrip - NASCO
5. Understanding Safe Use of Pesticides - Filmstrip - NASCO
6. Calibrating & Applying Pesticide Safely - Filmstrip - NASCO
7. Vegetable Insects - F801S, Cornell IMS
8. Greenhouse Insect and Disease Control Equipment - H503S, Cornell, IMS
9. Plant Diseases Around the Home and Grounds - H501ST, Cornell, IMS
10. Know Your Weeds - F302S, Cornell, IMS
11. Fundamentals of Plant Identification - F304S, Cornell, IMS

PLANT SCIENCE CURRICULUM

UNIT: Care and Management of a Vegetable Garden

LENGTH: 3 weeks

WHEN TAUGHT: Grade 9 or 10

OBJECTIVES: The student will be able to:

1. plan, plant, care for, and harvest vegetables from the home garden.
2. test and evaluate the garden's soil, both physically and chemically.
3. make a scale drawing of a garden and calcualte expected yield.

CONTENT:

I. Definition of vegetables

    A. vegetables vs. fruits
    B. identification of some common vegetables

II. The Vegetable Garden

    A. importance of a plan
    B. site selection
    C. soil test and interpretation
    D. planting

        1. seeds vs. plants
        2. timing
        3. cool vs. warm weather crops
        4. successive crops

    E. pest control

        1. weeds
        2. insects
        3. animals
        4. diseases

    F. harvesting
    G. post-season care

III. The Garden Plan

    A. what a scale drawing is
    B. how big the garden should be

        1. space available
        2. time available
        3. family harvest needs

C. draw the garden

1. list varieties
2. list expected yields for later comparison

TEACHER ACTIVITIES:

1. Use lecture periods to explain the proper planning, planting, care and harvesting of vegetable crops.

2. Demonstrate how to take a soil sample and interpret the results.

3. Demonstrate the use of drawing equipment in creating garden plan.

4. Demonstrate how to read and interpret various charts necessary to plan out space and harvest amounts.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture and discussion sessions.

2. Take test and interpret a soil test for a vegetable garden.

3. Make a scale drawing of a vegetable garden, listing varieties and expected yield.

4. Interpret charts of expected yields and planting distances of varieties used in the garden plan.

EVALUATION:

1. Review notebooks periodically.

2. Evaluate and correct student plan.

3. Evaluate students soil testing technique and interpretation of results.

RESOURCES:

1. Drawing materials.

2. Soil test kit - (home type).

BIBLIOGRAPHY:

1. McCollum, Producing Vegetable Crops, Interstate, 1980

2. University of CT, Drawing a Landscape Plan

3. Ware & McCollum, Raising Vegetables

4. Vegetable Gardening, Sunset Book

MEDIA:

1.

PLANT SCIENCE CURRICULUM

UNIT: Greenhouse Management

LENGTH: 3 weeks

WHEN TAUGHT: Grade 9 or 10

OBJECTIVES: The student will be able to:

1. understand the proper operation of a greenhouse.
2. study practices in the over-all operation of a greenhouse.
3. become acquainted with the operation of the greenhouse business.

CONTENT:

- I. Career Opportunities
- II. Establishing the Business
- III. Sales and Advertising
  - A. pricing
  - B. advertisement
  - C. retail vs. wholesale
  - D. trade periodicals and papers
  - E. certification of stock
- IV. Trade Organizations
  - A. specific crop organizations
  - B. nurserymens association
  - C. local organizations
  - D. state organizations
  - E. national organizations
  - F. experiment station and extension service
- V. Markets and Marketing
  - A. wholesale markets
  - B. retail markets
  - C. packing
  - D. storing stock and flowers
  - E. shipping
  - F. garden center operations
- VI. Greenhouse Management and Production
  - A. managing crop operations
  - B. managing greenhouse bedding operations

TEACHER ACTIVITIES:

1. Arrange field trips to various greenhouses, both wholesale and retail.

2. Order various supplies and crop plants for student use.

3. Explain the skills necessary for management of a greenhouse operation.

STUDENT ACTIVITIES:

1. Visit various retail and wholesale businesses.

2. Students help grow various crops in greenhouse.

3. Students will mantain a notebook on lecture and discussion sessions.

EVALUATION:

1. Review student notebooks.

2. Evaluate learning through quizes.

3. Evaluate students work in greenhouse.

RESOURCES:

1. Local greenhouses.

2. School greenhouse, supplies and equipment.

BIBLIOGRAPHY:

1. Nelson, Greenhouse Management for Flower & Plant Production

2. Nelson, Greenhouse Operation & Management, Reston, 1978

3. Nelson, The Greenhouse Grower - A Career in Floriculture, Interstate, 1977

4. William, Greenhouse Flowers & Bedding Plants for Agribusiness Studies, Interstate, 1975

MEDIA:

1.____________________

2.____________________

3.____________________

4.____________________

PLANT SCIENCE CURRICULUM

UNIT: Plant Identification

LENGTH: 3 weeks

WHEN TAUGHT: Grade 9 or 10, Spring or Fall

OBJECTIVES: The student will be able to:

1. visually identify commonly used trees, shrubs, vines, fruit, vegetables, weeds, etc.
2. use plant key to identify unknown plants.
3. identify plants by use of various plant parts morphology.
4. be able to understand the importance of botanical names.
5. identify growing season using plant hardness zone map.
6. demonstrate use of plant classification in relation to plant growth.

CONTENT:

I. Use of various plant keys in identification of unknown plant material

II. Collection and identification of various plant specimens

III. Learn the unusual features and cultural habits of plants for their value

TEACHER ACTIVITIES:

1. Use both lecture time and arrange for field trips to show various trees, shrubs, vines, fruits and vegetables grown in Connecticut.
2. Demonstrate use of plant keys.
3. Use lecture time, emphasizing development and importance of botanical names.
4. Use lecture time to explain classification of plants in relation to plant growth.

STUDENT ACTIVITIES:

1. Identify commonly grown trees, shrubs, vines, fruits and vegetables in Connecticut.

2. Identify unknown plants by use of a plant key.

3. Identify plants by use of botanical name.

4. Collect, preserve, identify and mount plant specimens.

5. Select plant material for appropriation using plant hardness zone map.

EVALUATION:

1. Periodic check of notebook on lectures and field trips.

2. Evaluate plant specimens collection.

3. Quizes on use of botanical names.

4. Identification of unknown specimens by use of plant key.

5. Quizes on identifying trees, shrubs, vines, fruits and vegetables grown in Connecticut.

RESOURCES:

1. Local field trips.

BIBLIOGRAPHY:

1. Fescher, Flower Family Album, Bonanza, 1970

2. Mower, Identification & Landscape Values of Woody Plants, IMS, Cornell

3. Wyman, Trees for American Gardens, MacMillan, 1975

4. Identification of Trees & Shrubs, Agricultural Education Center, Penn. State, University Park, Pennsylvania

5. Shrubs & Vines for American Gardens, Macmillan, 1975

6. Time-Life Encyclopedia of Gardening, Time-Life Books, 1975

MEDIA:

1. Plant I.D., Annual Perennials, Houseplants - Filmstrip - NASCO

2. Foliage Plant I.D. - Filmstrip - NASCO

3. Tree I.D. - Slides - NASCO

4. O.H. Plant I.D. - Slide - VEP

PLANT SCIENCE CURRICULUM

UNIT: Soils and Fertilizer

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 9 or 10, anytime.

OBJECTIVES: The student will be able to:

1. understand the importance of soils to student's choice of an agriculture career.
2. understand that natural forces have shaped and formed our soils that we must manage for crops.
3. test soil for both physical and chemical properties and be able to interpret those results.
4. interpret soils, maps and land capability classes.

CONTENT:

I. Career opportunities

II. Soil

   A. definition

      1. "good" crop soil

   B. soil profile

      1. horizon formation

III. Soil formation

   A. rock groups

      1. igneous (i.e. traprock)
      2. sedimentary (i.e. brownstone)
      3. metamorphic (i.e. feldspar)

   B. glaciation

      1. evidence in our area

         a. till, outwash, rocks, etc.

IV. Physical characteristics

   A. color, texture, structure, depth, organic matter, soil air, soil water

V. Chemical characteristics

  A. plant nutrients

    1. natural
    2. additives

  B. elements

    1. major
    2. trace

  C. ph

VI. Soil classification

  A. land capability classes
  B. soils maps

TEACHER ACTIVITES:

1. Use lecture periods to explain soil formation and importance to all of agriculture.

2. Demonstrate soil testing and analysis.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture and discussion sessions.

2. Take and test soil samples.

3. Interpret results of their soil test.

EVALUATION:

1. Review notebooks periodically.

2. Evaluate student comprehension with quizzes.

3. Evaluate student's soil test recommendations.

RESOURCES:

1. Equipment

  A. soil test kit
  B. ph meter
  C. pails, shovels, clipboards
  D. sample of various soil types and components

BIBLIOGRAPHY:

1. A Connecticut Soils Primer, College of Agriculture, University of Connecticut, Storrs, CT.

2. Donahue, Our Soils & Their Management, Interstate
3. Foster, Approved Practices in Soil Conservation, Interstate
4. Jons, Fertilizers & Soil Fertility, Reston, 1979

MEDIA:

1. How to Take a Soil Sample, Slides - NASCO
2. Our Living Soil, Slides - NASCO
3. Know Your Land, Slides - Ohio, 1979
4. Soil & It's Properties, Slides - Ohio 1971
5. Timing Acid Soils, Slides - Ohio 1971

VOCATIONAL AGRICULTURE SPECIALIZATION GRADES 11 & 12

AGRICULTURE MECHANICS

Advanced Agriculture Welding SM 1 * 6 weeks	Building upon previously acquired skills, this unit emphasizes further development of skills in welding and their practical application. Included, will be vertical and overhead arc welds, as well as heating, bending, brazing, hard surfacing, and soldering. Safety for the operator and others will be stressed.
Advanced Machinery Repair and Maintenance SM 5 * 6 weeks	Learned shop skills will be applied to the servicing, repairing and periodic maintenance of machinery from agricultural enterprises common to the school area.
Agricultural Surveying SM 8 * 6 weeks	Develops the skills of using surveying tools and equipment both in the measurement of land and the planning of land installations and buildings.
Alternate Energy SM 11 * 3 weeks	Develops the understanding of sources of energy available to agricultural operations and to study methods of application in the use of alternate sources of energy.
Concrete for Farm Use SM 15 * 3 weeks	Develop skills of using concrete and masonry in agricultural structures. The mixing and handling of concret and mortor, the use of blocks and brick, as well as how to get a proper cure will be stressed.
Diesel Fuel Systems SM 18 * 3 weeks	Develops appreciation of uses for diesel engine power and an understanding of the principles of how a diesel engine operates. Skills of care, maintenance, basic adjustments, and trouble shooting will be taught.
Electric Motors & Controls SM 22 * 6 weeks	How to identify types of electric motors, their component parts and related controls, as well as to select which should be used for different purposes will be taught. Skills of reading schamatics and plans of installations, as well as maintenance of equipment will be developed. Safety and protective devices will be stress
Equipment Assembly SM 27 * 6 weeks	The interpretation of plans, the proper assembly of agricultural equipment, the adjustment of equipment and the appreciation of the work ethic will be taught. Safety and the recording of information will be stressed.
Farm Waste Disposal SM 29 * 3 weeks	An appreciation of laws, regualations which govern the handling of agricultural waste. Develop a knowledge of the value of waste and methods of handling and safe disposal of waste.

VOCATIONAL
AGRICULTURE
SPECIALIZATIO
GRADES 11 & 1

AGRICULTURAL MECHANICS

Fencing SM 31 * 3 weeks	Will learn how to select materials, properly install them and maintain the installation in accordance with the specific functions for the appropriate fencing application.
Field Machines (Operation & Adjustment) SM 34 * 6 weeks	How to select, operate, adjust and maintain field machines common to the region it will be taught. Reconditioning and repair skills will be developed.
Hydraulics SM 37 * 3 weeks	An understanding of the principles of hydraulics and the application of uses will be developed.
Independent Shop Projects SM 41 * 6 weeks	Student will repair or construct a project using proper planning, correct equipment and tools. Performing in a safe manner will be required.
Power Traines & Transmissions SM 43 * 3 weeks	Types of power trains, their principles of operation and their adaptation will be taught. Care, maintenance, and adjustment will be stressed.
Private Water Supplies & Septic Systems SM 46 * 3 weeks	Determining water needs, sources of supply and systems of handling will be studied. Maintaining water quality and disposal of septic waste will be stressed.
Small Gasoline Engine Repair and Overhaul SM 50 * 6 weeks	Understand the use, care, repair and operation of the small gas engine. The skills of overhaul and repair will be stressed.
Structures SM 55 * 6 weeks	The determining of types of farm buildings and the materials to be used in their construction will be studied. Skills of construction, repair and maintenance will be developed.
Tractor Engine Overhaul SM 59 * 6 weeks	Trouble shooting, servicing, repairing and basic overhaul of the internal combustion engine will be taught.
Tractor Maintenance SM 63 * 5 weeks	An understanding of the function of tractor systems and skills for maintenance and repair will be taught. Following the operator's and owner's manual will be stressed.

VOCATIONAL AGRICULTURE SPECIALIZATION GRADES 11 & 12

ANIMAL SCIENCE

Beef Cattle SA 1 * 6 weeks	Development of an understanding of beef breeds and types of beef operations involved in the beef production business. The skills of care, development of breeding programs and marketing will be stressed.
Breeding & Genetics SA 5 * 3 weeks	The reproduction systems of animals and their functions will be studied. An understanding of breeding procedures and care from conception through birth will be studied. Developi breeding programs and understanding genetics will be stressed
Dairy Management SA 8 * 3, 6 weeks	The operation and management of a dairy farm, including care from birth through the dairy animals production years will be studied. Skills of calf care, heifer raising, fitting & showing, feeding, milking, attention to health, record keepin and sale of products will be stressed.
Dairy Products SA 13 * 3, 6, 9, 12 weeks	The processing of milk and milk products with the related ski will be taught. Understanding marketing procedures and quali control will be stressed.
Goat Management SA 16 * 3 weeks	Skills of establishing a flock, feeding for production, providing proper housing, taking care of health, milking, and the marketing of products will be developed.
Horses & Horsemanship SA 20 * 3 weeks	An understanding of types of horse operations, breeds and the industry as a whole will be taught. Skills of care, feeding, handling, training, buying and selling will be developed.
Livestock Judging SA 27 * 3 weeks	The skills of visually evaluating animals based on desirable traits related to use and/or to market demands will be developed. Performance, as well as appearance will be stressed
Meat Science SA 30 * 3 weeks	Development of meat inspection, grading and marketing will be taught. Skills of meat handling, processing and merchandisin will be stressed.
Poultry Management SA 34 * 6, 9, 12 weeks	The skills of hatching, rearing and managing for egg or for meat production will be taught. Nutrition, disease control, housing, breeding and product marketing will be stressed.
Sheep Production SA 37 * 3, 6 weeks	An understanding of the sheep industry and how breeds fit particular needs will be taught. Skills related to housing, feeding, health, general care, judging and marketing will be stressed.

ANIMAL SCIENCE

Small Animals SA 42 * 3 weeks	An understanding of how small animals are used for the purpose of pets, food, and research will be studied. Skills of housing feeding, health care, selection, breeding, and marketing will be developed.
Swine Management SA 46 * 6 weeks	An understanding of the swine industry and the career opportunities available will be studied. Skills of selection, breeding, farrowing, raising, feeding, health care, keeping records and marketing will be developed.
Veterinary Science SA 51 As situation dictates	An understanding of careers, office procedures and kennel management will be studied. Skills of animal restraint, hygiene, laboratory test, identifying instruments and recognizing common ailments will be stressed.

VOCATIONAL
AGRICULTURE
PECIALIZATION
RADES 11 & 12

NATURAL RESOURCES

Course	Length	Description
Chain Saw Operation & Maintenance SR 1	* 6 weeks	Skills of operation, upkeep and repair will be taught. Matching kinds of chain saws with work to be done and the safe use of a properly adjusted, well-maintained chainsaw will be stressed.
Christmas Tree Production SR 8	* 3 weeks	Procedures to follow in the establishment and maintenance of a Christmas tree plantation will be taught. Skills involved in harvesting and marketing of Christmas trees will be developed.
Fish Culture SR 41	* 3 weeks	Skills of identifying fish species, their habits and laws pertaining to each will be developed. The setting up and operation of a fish hatchery will be taught. Basic skills of sports fishing will be reviewed. A review of commercial fish farming will be taught.
Forest Fires: Prevention and Control SR 18	* 3 weeks	An understanding of the causes of forest fires and their effects will be developed. Skills of using equipment in the prevention and control of forest fires will be taught.
Forest Harvesting Practices SR 22	* 6 weeks	The skills of cutting, hauling, marketing and carrying out safe practices will be developed. Measuring lumber, writing sales and determining procedures for realizing the greatest return from forest plots will be taught.
Forest Measurement SR 28	* 3 weeks	Determining the amount of harvestable product on a site will be taught. Skills of using tools and instruments and marking of trees for harvest will be developed.
Forest Products SR 35	* 3 weeks	An understanding of types of lumber and their uses in the market place will be developed. By-products of the forest will also be studied.
Forest Protection SR 39	* 3 weeks	Identification of insects, diseases, and pests which cause injury to forests will be taught. Skills involved in prevention and control of insects, diseases and pests will be developed.
Forest Soils SR 42	* 3 weeks	Methods of determining those soil properties that are conducive to production of forest products. Skills of managing forest products. Skills of managing forest soils so as to maintain productivity and avoiding its destruction will be developed.

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SPECIALIZATION
GRADES 11 & 12

NATURAL RESOURCES

Forest Surveying & Land Measurement SR 45 * 3 weeks	Skills of using surveying instruments and tools will be developed. Measurement of land areas and slopes will be studied. Mapping and developing of plot plans will be done.
Game Bird Propogation SR 48 * 3 weeks	Skills of identification, breeding, hatching, brooding and raising game bird species commonly marketed in the region will be developed. Health problems and stocking procedures will be stressed.
Introductory Taxidermy SR 53 * 3 weeks	Skills of preparing fish specimens, using techniques of plaster cast molding will be taught.
Outdoor First Aid SR 57 * 3 weeks	The importance, scope and limitations of first aid in treating accident victims will be stressed. Treating wounds, sprains, fractures, shock, poisoning, bites, plant poisoning and [illegible]. Skills of artificial respiration and transportation of injured persons will be developed.
Recreation SR 61 * 3 weeks	The ability to analyze the outdoor recreational potential for communities and land areas will be stressed. Procedures for developing outdoor recreation areas and preserving them for long term use will be taught.
Timber Management Practices SR 65 * 6 weeks	The prescribed procedures of weeding, pruning, thinning and harvesting forest areas will be stressed. Types of forest management services and how they operate will be taught.
Tree Identification SR 70 * 3 weeks	Students will be taught to identify those tree species which have economic effect on the forest industry of the area. Recognition at differing stages of growth and seasons of year will be stressed. Factors which encourage or those which limit species of trees growing will be taught.
Water Supply - Quality Determination SR 73 * 3 weeks	Determining water supply sources, potential causes of pollution, method of testing for contamination and procedures for maintaining clean water supplies will be taught. Water shed evaluation will be stressed.
Wildlife Management SR 78 * 6 weeks	The skills of identifying types of wildlife and their habitat will be developed. How to maintain wildlife and control its harvest will be taught. The ability to handle firearms safely will be stressed.

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AGRICULTURE
PECIALIZATION
RADES 11 & 12

PLANT SCIENCE

Bedding Plants SP 1 * 4 weeks	The skills of preparing medium, planting seeds, transplanting, caring for growing plants and marketing of vegetables and flower garden plants which are started early will be developed. The environmental controls, watering and control of diseases and insects will be stressed.
Christmas Holiday Production & Marketing SP 4 * 3 weeks	Procuring and marketing of trees, wreaths, seasonal plants and flowers will be taught. The skills of making wreaths, carrying on sales, keeping records and caring for materials will be stressed.
Floral Design SP 7 * 5 weeks	The skills of procuring materials, creating the design, and pricing the product for centerpieces, bouquets, baskets, sprays corsages and specialty items will be developed.
Fruit Production and Marketing SP 10 * 5 weeks	The skills of developing and managing an orchard of apples, peaches, pears or plums will be taught along with the those involved with such small fruits as strawberries, grapes, blueberries or brambles. Methods of harvest, storing and marketing will be stressed
Greenhouse Crop Production & Marketing SP 12 * 6 weeks	Skills of propogating, raising, harvesting and marketing greenhouse crops commonly grown in the area. Understanding the specific requirements of various greenhouse crops will be stressed.
Greenhouse Structures SP 14 * 4 weeks	The component parts and systems of various types of greenhouse will be taught. Understanding the sturcture, function, operation and control of the systems will be stressed. Greenhouse planning and construction will be reviewed.
Interior Landscaping SP 20 * 4 weeks	The design, selection of materials, installation and the maintenance of an interior landscape will be taught. Commercial applications of interior landscaping will be stressed.
Landscape Construction SP 23 * 4 - 6 weeks	The procedures of installing the materials of a landscape design so that the site will have appeal, can be maintained and will withstand the rigors of time will be taught. Procuring materials and estimating cost will be stressed.

VOCATIONAL
AGRICULTURE
PECIALIZATION
RADES 11 & 12

PLANT SCIENCE

Landscape Design SP 26 * 4 weeks	The skills of selecting materials and locating them on a design to give a site function and appeal will be taught. The skills of drawing and constructing models will be stressed.
Landscape Maintenance SP 28 * 4 weeks	The skills of pruning, fertilizing, watering, mulching, controlling pests and the care of lawns will be taught.
Nursery Management SP 30 * 6 weeks	Propogating, fertilizing, pruning, watering, spraying, controlling pests, cultivating and harvesting will be taught. The skills of identifying nursery stock and recognizing specialized cultural care will be stressed.
Operation and Care of Horticulture Equipment SP 34 * 6 weeks	The skills of safe use and operation of well maintained Horticultural tools and equipment will be stressed. The use of small engine type power equipment and the procedures of maintenance will be taught.
Perennial Plant Production & Marketing SP 37 * as situation dictates	The skills of identifying, propagating, and growing perennials will be stressed. How to plant, fertilize, cultivate, water and protect will be taught.
Plant Anatomy and Function SP 40 * 4-6 weeks	The identification of plant parts, a knowledge of their functio and the factors which control plant function will be taught.
Plant Nutrition SP 42 * 4-6 weeks	The nutritional requirements for plant growth, how they are provided for the plant and the effects of an improper amount of nutrition available will be taught. Skills of testing for nutrients, determining fertilizing programs and applying fertilizers will be stressed.
Plant Propogation SP 46 * 3 weeks	An understanding of propagating plants by sexual and asexual methods will be taught. Skills of making cuttings and grafts and of producing and handling seeds will be stressed.
Retail Flower Shop Management SP 48 * 4-6 weeks	Understanding the stocking, displaying, advertising and selling of retail florist supplies and creations will be taught. Skills of working with the public, keeping records, handling the product and shop arrangement will be stressed.
Turf Management SP 50 * 5 weeks	Skills of establishing, watering, fertilizing, mowing and protecting turf will be stressed.

VOCATIONAL
AGRICULTURE
SPECIALIZATION
GRADES 11 & 12

PLANT SCIENCE

Vegetable Production and Marketing SP 53
☆ 5 weeks

Skills of developing a cropping plan, preparing the site, planting the crop, fertilizing, cultivating, controling diseases and insects, harvesting and marketing will be taught.

Bee Production SP 56
☆ 6 weeks

The skills of establishing and caring for a beehive will be taught. An understanding of the value of bees for pollination and for the production of honey will be developed.

GENERAL AREAS
(Applies to all Taxonomies)

UNIT: Agricultural Business Management

LENGTH: 12 Weeks

WHEN TAUGHT: Grade 11, 12. Advanced unit for all students of vocational agriculture.

OBJECTIVES: The student will be able to:

1. define, explain and compare partnerships, cooperatives, corporations and private ownerships.
2. define and explain the purpose of trade organizations.
3. develop and explain a total budget, partial budgeting and cash flow.
4. explain the various loan institutions and know the advantages and disadvantages of each.
5. explain the difference between various types of loans.
6. complete a loan application form.
7. explain simple and compound interest and know how to calculate it.
8. identify record systems and their individual uses.
9. list and explain the various components of a record keeping system and be able to complete a financial statement, do an inventory, and know how to compute depreciation.
10. fill out a tax return.
11. evaluate and analyze records.
12. explain the basic principles of marketing.
13. explain supply and demand.
14. understand and explain a lease agreement versus renting.
15. write a lease agreement.
16. explain the importance of a contract under a partnership and be able to draw up an agreement.
17. understand and explain knowledge with unions, wage laws, benefits and employee-employer relationships.
18. understand and explain the basic insurances.
19. demonstrate salesmanship skills.

CONTENT:

- I. Business organization
  - A. partnership
  - B. cooperatives
  - C. corporations
  - D. private ownership
- II. Trade organizations
  - A. Farm Bureau
  - B. Extension Service
  - C. production credit
- III. Planning & developing a budget
  - A. total budget
  - B. partial budget
  - C. cash flow
- IV. Credit
  - A. loan institutions
    - 1. PCA
    - 2. FHA
    - 3. local banks
    - 4. equipment dealers
    - 5. private
  - B. types of loans
    - 1. long term
    - 2. short term
    - 3. notes
  - C. loan applications
  - D. interest rater
    - 1. simple
    - 2. compound
  - E. repayment plans
- V. Record systems
  - A. Agrifax
  - B. Agway
  - C. Farm Bureau
  - D. Elfax
- VI. Record components
  - A. financial statements

B. inventory
C. depreciation

VII. Tax returns

VIII. Business evaluation and analysis of records

IX. Marketing

A. basic principles - supply and demand
B. salesmanship

X. Contracts

A. leasing/renting
B. partnerships
C. insurances

XI. Labor management

A. unions
B. wages
C. benefits
D. employee-employer realationship

TEACHER ACTIVITIES:

1. Utilize resource people from financial institutions and farm organizations.

2. Use lecture periods to explain unit materials.

3. Utilize IRS prepared materials.

4. Use prepared materials from established agricultural record keeping systems and financial institutions.

5. Use Supervised Occupational Experience program records for personal evaluations and analyzation of student records.

6. Plan field trips to financial and credit institutions.

7. Set up activities in class or FFA fund raising activitiy for selling agriculture products.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture and discussion sessions.

2. Answer study questions to be presented after each lecture.

3. Develop a lease agreement, loan application and IRS tax return.

4. Evaluate and analyze their own SOEP.

5. Work in sales and marketing activities in class and FFA.

EVALUATION:

1. Review notebooks regularly.
2. Evaluate student learning by periodic quizzes and tests.
3. Evaluation of completed projects.

RESOURCES:

1. Professional personnel from financial institutions, farm organizations and other areas of concern.
2. Prepared instructional materials from financial institutions, farm organizations, IRS and selected other materials.
3. Use of students' individual SOEP record books.

BIBLIOGRAPHY:

1. Castle, Becker, Smith, Farm Business Management, Mac Millan Co., New York, NY, 10022.
2. Hamilton, Bryant, Profitable Farm Management, Prentice-Hall, Englewood Cliff, NJ, 07632, 1963.
3. Herbst, Farm Management (Principles-Budgets-Plans), Stipes Publishing Co., Champaign, IL, 61820, 1976.
4. Hopkins, et al., Financial Management in Agriculture, Interstate Publishing Co., Danville, IL 61382, 1973.
5. Osburn, Schneeberger, Modern Agricultural Management, Reston Publishing Co., Englewood Cliff, NJ 07632,1978.
6. Osburn, Schneeberger, Financial Planning in Agriculture: A Key To Credit and Money Management, Interstate Publishing Co., Danville, IL 61832, 1977.
7. Osburn, Schneeberger, Farm Management Manual: A Guide for Class and Contest Training, Interstate Publishing Co., Danville, IL, 1978.
8. Shepard, Futrell, Strain, Marketing Farm Products, Iowa State University Press, Ames, Iowa, 50011, 1976.
9. Osborn, Schneeberger, Modern Agriculture Management, Reston Publishing Co., Inc., Reston, Virginia, 1978.

MEDIA:

1. ____________________

2. ____________________

GENERAL AREAS

(Applies to all Taxonomies)

UNIT: Career Preparation and Decision Making

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11, 12. Teach in the last part of Junior year or early in the Senior year to help students prepare for next step in educational or occupational planning. Teach as a unit and integrate, where appropriate, the career implication of the subject matter taught throughout the program.

OBJECTIVES: The student will:

1. develop competence in the basic academic skills required to adapt in our rapidly changing society.
2. develop and exhibit good work habits.
3. develop job hunting skills and job-getting skills.
4. identify and develop specific occupational and interpersonal skills needed to gain entry into and advance in an agricultural occupation.
5. develop an awareness of the means available for college, post-secondary or continuing education.

CONTENT:

I. Basic skills
    A. identifying basic skills needed for occupational success
    B. understanding how basic skills contribute to success on the job
    C. inventorying basic skills mastered and those yet to be further developed

II. Work habits and worker traits
    A. identifying desirable work habits
    B. understanding employer expectations
    C. developing desirable behavior and attitudes on the job
    D. maintaining safety in the workplace
    E. making the first day on the job a success

III. Job hunting and job-getting skills
    A. sources of jobs
        1. employment agencies
        2. newspaper want ads
        3. personnel offices
        4. bulletin boards
        5. radio and television
        6. school counselors office
        7. vo-ag placement service
        8. other

B. methods of applying for a job

1. interviews
2. applications
3. letters
4. telephone
5. resume
6. other

C. information needed in applying for a job

1. birthdate or birth certificate
2. birthplace
3. personal data
4. social security number
5. resume
6. work permit
7. other

D. follow-up
E. employment tests
F. local opportunities in farming or agricultural firms

IV. Occupational and interpersonal skills

A. occupational skills

1. determining the domain of the job or occupation
2. identifying specific competencies needed
3. developing and practicing competencies

B. interpersonal skills

[illegible]ifying interpersonal skills
[illegible] being supervised
3. supervising others
4. handling customer complaints/problems
5. using the telephone
6. working as a team
7. other

C. handling the paycheck

1. understanding social security
2. understanding payroll deductibles
3. budgeting
4. investing and saving
5. establishing and using credit
6. credit

V. Educational planning

A. inventorying educational needs
B. identifying educational opportunities
C. developing rapport with counselors, vo-ag teachers, etc., regarding career plans

D. assessing educational requirements for career entry
E. becoming a lifelong learner
F. making educational and occupational decisions

TEACHER ACTIVITIES:

1. Emphasize the emportance of the unit by planning relevant motivational activities and questions.

2. Coordinate activities with the career education specialist or career counselor.

3. Collect and make available materials on employment and agricultural careers.

4. Prepare career awareness activities and lessons.

5. Help each student develop a plan for attaining next step in educational or occupational goals.

STUDENT ACTIVITIES:

1. Maintain a notebook on class presentations and discussions.

2. Maintain a folder of employment and career related materials.

3. Inventory the degree of competence developed in basic skills.

4. Identify and assess desirable worker habits and traits needed for success on the job.

5. Participate in simulated interviews.

6. Prepare a resume.

7. Complete an occupational skills and an interpersonal skills inventory.

8. Schedule career and/or educational planning visits with guidance personnel.

9. Discuss career plans with the vo-ag instructor on an individual basis.

EVALUATION:

1. Evaluate student notebooks, reports and plans.

2. Use end of unit examination and periodic quizzes.

RESOURCES:

1. Guidance office personnel and materials.

2. Self awareness, values clarification and decision making materials and audio-visuals.

3. Materials on career opportunities in agriculture/agribusiness.

4. College, post-secondary, technical, and continuing education brochures and bulletins.

BIBLIOGRAPHY:

1. Dictionary of Occupational Titles, U.S. Department of Labor, Washington, D.C.

2. Occupational Outlook Handbook, U.S. Department of Labor Statistics, Washington, D.C., March 1980.

3. National Agricultural Occupations Competency Study, U.S. Department of Health , Education, and Welfare, Washington, D.C. 1978.

4. Occupational Outlook Quarterly, U.S. Department of Labor Statistics, Washington, D.C.

MEDIA:

1. Selected filmstrips from career education specialist.

2. Charts on agricultural careers.

GENERAL AREAS
(Applies to all Taxonomies)

UNIT: Future Farmers of America (FFA) Advanced

LENGTH: 6 Weeks

WHEN TAUGHT: Grades 11, 12. Advanced unit for all students of vocational agriculture.

OBJECTIVES: The student will be able to:

1. define and/or explain local, state and national recognition programs.
2. define and evaluate personal leadership capabilities as outlined in the state degree programs.
3. demonstrate ten parliamentary procedure abilities.
4. deliver a five minute speech.
5. complete and evaluate a personal proficiency award application.

CONTENT:

I. Recognition Programs
    A. local, state, national
        1. BOAC
        2. Safety
        3. Superior Chapter
        4. Foundation/Proficiency Award
        5. Contests
            a. skills
            b. leadership
        6. Scholarships
    B. degree requirements
        1. State Farmer and Agribusinessmen
        2. American Farmer and Agribusinessmen

II. Member Activities
    A. parliamentary procedure (10 abilities)
    B. public speaking (minimum 5 minutes)
    C. evaluation of leadership skills
        1. state degree application
        2. proficiency award application

TEACHER ACTIVITIES:

1. Instructor will use National FFA prepared materials. (see reference list)

2. Instructor will use mini-chapters.

3. Instructor will use competitive skill and leadership activities.

    a. public speaking
    b. parliamentary procedure
    c. application forms
    d. local, district, state contests

STUDENT ACTIVITIES:

1. Students will actively participate in committees.

2. Students will attend Chapter meetings and participate in mini-chapters, district and state activities.

3. Student participation in local, district and state contests.

4. Students will maintain records on leadership activities.

EVALUATION:

1. Review notebooks regularly .

2. Have student demonstrate leadership skills.

3. Evaluate student learning with quizzes and tests.

4. Evaluate completed proficiency award application.

5. Evaluate completed state farmer/agribusinessperson application.

RESOURCES:

1. Contact State Department of Education for State publications on the FFA.

2. Use of official FFA materials, to include:

    a. official manual
    b. Student Handbook
    c. Advisors Handbook
    d. FFA Organizational Pamphlet
    e. selected audio visuals
    f. Activity Handbook
    g. chapter guide
    h. chapter paraphernalia
    j. Official FFA Supply Catalog

3. Chapter Files

4. Utilization of resource people, to include:

    a. chapter officers
    b. state officers
    c. alumni
    d. State agriculture staff
    e. others

BIBLIOGRAPHY:

1. National FFA Center, Box 15160, Alexandria, VA 22309.
(see resource list above)

2. Robert, Henry M., Robert's Rules of Order, Scott, Foresman and Company, 1970.

MEDIA:

1. ____

2. ____

GENERAL AREAS

(Applies to all Taxonomies)

UNIT: Records for Experience Programs

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11, 12. Teach as a unit or on an individualized basis as appropriate.

OBJECTIVES: The student will be able to:

1. evaluate and analyze SOEP records.
2. evaluate and re-assess occupational opportunities.
3. develop inventory skills and re-establish personal and occupational goals.

CONTENT:

I. Evaluating and analyzing SOEP records
    - A. closing record books and figuring end of year inventory
    - B. determining net worth
    - C. summarizing hours and wages
    - D. filing income tax
    - E. analyzing efficiency factors
    - F. setting production goals for upcoming year

II. Re-evaluating and re-assessing occupational opportunities
    - A. re-evaluating the content and scope of the program
    - B. explaining and re-assessing other opportunities in agriculture
    - C. expanding the SOEP

III. Inventorying saleable and leadership skills developed and re-establishing goals
    - A. inventorying saleable technical skills developed
    - B. inventorying leadership skills developed
    - C. setting educational goals
    - D. setting goals regarding the acquisition of technical knowledge and skills
    - E. settsng leadership goals

TEACHER ACTIVITIES:

1. Plan time for record analysis and evaluation.
2. Summarize total chapter net worth by grade level and publicize where approriate.
3. Collect and distribute appropriate income tax forms.
4. Coordinate SOEP development with career objectives of the students.
5. Coordinate SOEP records with FFA applications.

STUDENT ACTIVITIES:

1. Maintain vo-ag record books throughout the year.
2. Conduct an end of the year analysis of the record book.
3. Re-evaluate and re-plan their future educational, occupational and leadership goals.
4. Develop an appreciation of the importance of records in personal and occupational advancement.

EVALUATION:

1. Evaluate student record books.
2. Evaluate and summarize efficiency factors.
3. Evaluate student plans made and goals established.
4. Use end of unit examination and periodic quizzes.
5. Evaluation by the supervisor and/or employer.

RESOURCES:

1. Approved vo-ag record books
2. Appropriate tax forms.

BIBLIOGRAPHY:

1. Record books available from National FFA Supply Service, Alexandria, Virginia.
    - A. Guide for Using Vocational Agriculture Record Book for Production Agriculture.
    - B. Record book for Placement/Directed Laboratory Experience Program.
    - C. Record book for Basic Experience Program.
    - D. Record bood for Ownership Experience Program.
2. Vocational Agriculture Record Book for Agricultural Production, The French-Bray Printing Company, Glen Burnie, MD 21061.
3. Supervised Occupational Experience in Agriculture, Plans and Records, The French Bray, Glen Burnie, MD 21061.
4. National Agricultural Occupations Competency Study, U.S. Department of Health, Education, and Welfare, Washington, D.C. 1978.

MEDIA:

1. More than profit, slides available from the Naitonal FFA Supply Service.
2. FFA-Preparing for Progress, slides available from the National FFA Supply Service.

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Advanced Agricultural Welding

LENGTH: 6 Weeks

WHEN TAUGHT: Grades 11, 12.

OBJECTIVES: The student will be able to:

1. select recommended electrodes.
2. identify metals.
3. arc weld flat, horizontal, vertical and overhead.
4. apply hard surfacing material, using the arc welder, carbon arc torch and the oxyacetylene outfit.
5. weld cast iron.
6. cut with the arc welder and oxyacetylene.
7. braze with the carbon arc torch and oxyacetylene.
8. spot weld sheet metal.
9. solder the arc welder, and oxyacetylene.

CONTENT:

I. Safety

    A. eye protection needed
    B. body protection, including hands and face
    C. fire extinguishers and how to use them
    D. fire blanket and its use

II. Selecting electrodes

    A. identify metals

        1. spark test
        2. color

    B. use electrode selection guide

        1. handbooks
        2. wallcharts
        3. label on boxes or cans of electrodes

II. Evaluating welds

    A. external visual inspection
    B. break test
    C. cause of faulty welds

1. incorrect heat
2. incorrect electrodes, size and use
3. wrong speed
4. inadequate metal preparation

IV. Weld horizontal, vertical and overhead

A. select electrode

1. kind of metal
2. thickness of metal
3. strength needed

B. use the recommended amperage
C. clean weld
D. evaluate weld

V. Hardsurface a plow share other material

A. select electrode

1. kind of wear

B. determine method of application
C. determine technique of application

VI. Cast iron

A. identify type of cast iron

1. spark test
2. color

B. using the arc welder

1. preheating
2. amperage setting
3. motion
4. penetration
5. cooling

C. using oxyacetylene

1. preheating
2. tip size
3. rod selection
4. motion
5. use of flux

VII. Cutting

A. safety
B. arc welder

1. select electrode
2. amperage setting
3. motion

- C. oxyacetylene
    - 1. select pressures of oxygen and acetylene
        - a. thickness of metal
    - 2. marking
    - 3. cutting tip angle

VIII. Brazing

- A. metal preparation
- B. heat source - carbon arc torch, oxyacetylene
- C. flux
- D. rod selection

IX. Spot welding

- A. metal preparation
- B. amperage
- C. evaluating

TEACHER ACTIVITIES:

1. Show slides, filmstrips.

2. Demonstrate all practices.

3. Secure materials needed for practice.

4. Evaluate.

STUDENT ACTIVITIES:

1. Identify metals.

2. Select electrodes.

3. Practice welding:

    - A. padding
    - B. horizontal, vertical and overhead

4. Practice headsurfacing.

5. Practice cast iron welding.

6. Practice cutting.

7. Practice brazing.

8. Practice spot welding.

EVALUATION:

1. Rate final practice piece.

2. Rate ability to apply above practices.
3. Quizzes and tests.

RESOURCES:

1. Shop equipment.
2. Scrap metal.
3. Examples of good welds.

BIBLIOGRAPHY:

1. Arc Welded Projects, Vol. I. c. 1958 and Vol. II c. 1978, The James F. Lincoln Arc Welding Foundation.
2. Jefferson, T.B. and Woods, Gorham, Metals and How to Weld Them, The James F. Lincoln Arc Welding Foundation.
3. Oxyacetylene Handbook, Linde Air Products.
4. Seeber, Glen, & Allen, Ray, Oxyacetylene Welding, California State Polytechnical College.
5. Sosin, H.A., Arc Welding Instructions for Beginners, The James F. Lincoln Arc Welding Foundation, Cleveland Ohio, 1964.
6. Welding, FOS, Deere & Company, Moline, IL., 1971.

MEDIA:

1. Lincoln Arc Welding filmstrip.
2. VEP - oxyacetylene welding filmstrip.
3. Overhead transparencies.
4. Film on welding.

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Agricultural Machinery Repair and Maintenance

LENGTH: 6 weeks

WHEN TAUGHT: Grade 11-12

OBJECTIVE: Students will be able to:

1. understand and appreciate agricultural machinery repair functions.
2. maintain and service agricultural machines.
3. spray paint agricultrual equipment.
4. read and follow instructions properly.
5. apply learned shop skills on machinery.
6. manage and schedule repairs for machines.
7. plan storage procedures for machines.
8. work well independently and make decisions involving farm machinery.

CONTENT:

I. Establish Need for Machinery Repair

   A. visit local agriculturalists to discuss repairs
   B. cooperate with equipment dealers
   C. establish student need and project
   D. review essential management functions in machine repair - scheduling, parts ordering, use of manuals and repair instructions.
   E. review general shop safety

II. Spray Painting

   A. machine preparation (surface preparation)
   B. spray equipment type and use
   C. paint and solvent selection and safe storage
   D. application of paint
   E. clean-up and storage of spray equipment

III. Repair Project

   A. establish student projects (individual or group)
   B. provide shop space and equipment

C. power machine systems - clean and maintain power system
D. repair hydraulics system
E. repair other functions of machine using wood, metal, welding, power mechanics skills
F. paint application using skills in Sec. II.

IV. Management Functions

A. cost analysis of repairs
B. establish repair supply locations
C. record keeping

V. Storage of Machines

A. review options of safety, insurance, buildings, orderliness, etc.
B. preparation of machine for storage

TEACHER ACTIVITIES:

1. Use lecture and demonstration time to:

    A. present review session on use of shop equipment, procedure, and safety
    B. establish management system of repair

2. Demonstrate painting technique.

3. Prepare shop for projects.

4. Provide equipment, supplies, reference materials.

5. Plan visit to local agriculturalists to discuss and view machine repairs.

6. Plan visit to equipment dealer.

7. Supervise individual or group repair projects.

8. Coordinate projects to SOEP and FFA activities of students.

STUDENT ACTIVITIES:

1. Visit local agriculturalists and equipment dealers.

2. Inventory local area repair shops for agricultural equipment.

3. Identify sources for supplies for repairs.

4. Set up a machine repair schedule for an agricultural business of their choice.

5. Perform repair skills on at least one agricultural machine.

6. Paint an agricultural machine.
7. Prepare a machine for proper storage.
8. Record skills and time spent on individual shop projects.

EVALUATION:

1. Projects evaluated using shop evaluation criteria.
2. Inventory, source of supply, skill sheet evaluated.

RESOURCES:

1. Agricultural mechanics shop, tools, equipment, supplies reference materials.
2. Local agriculturalists, machinery dealers.
3. Agricultural equipment.
4. Owners manuals, repair instructions, part books.

BIBLIOGRAPHY:

1. Bainer, R. et. al, Principals of Farm Machinery, John Wiley and Sons, N.Y.
2. Smith, H.P., Farm Machinery and Equipment, McGraw-Hill, N.Y.
3. Stone, A. et. al., Machines for Power Farming, John Wiley and Sons, N.Y.
4. AAVIM Publications
5. National Agriculture Occupations Competency Study
6. Owners Manuals for Agricultural Equipment

MEDIA:

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Agricultural Surveying

LENGTH: 6 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: Student will be able to:

1. determine distances using a steel tape and pacing.
2. measure a right angle using a steel tape.
3. determine field acreage.
4. use sighting level to locate contour lines and measure slope.
5. set up tripod and level.
6. read a leveling rod.
7. record information in a field notebook.
8. ren contour lines.
9. calculate cuts and fills.
10. set up foundation lines, batter boards and construction lines.

CONTENT:

I. Distance determination
   A. pacing
   B. steel tape

II. Right Angles
   A. 3-4-5 method

III. Field Acreage
   A. square feet
   B. divide by 43,560

IV. Locating contour lines and slopes
   A. use of the band-level

V. Setting up tripod & reading leveling rod

  A. use of the level
  B. set up tripod & level
  C. read the rod, architect and engineers

VI. Record information

  A. standard information
  B. plot plan
  C. actual measurements

VII. Calculating cuts and fills

  A. bench mark
  B. record information in notebook
  C. determine need for a cut or fill & how much

VIII. Run contour lines

  A. determine drains
  B. ease of machinery operation
  C. control erosion

IX. Stake out a building foundation

  A. locate corners
  B. use level to locate batter board height
  C. use string to locate corners

TEACHER ACTIVITIES:

1. Demonstrate pacing, using a steeltape, setting up a tripod and level, reading a rod, using a field notebook, running contour lines, and setting up batter boards.

2. Show slides and/or filmstrips in use of tripod and level.

3. Secure materials for practice exercises.

STUDENT ACTIVITIES:

1. Practice pacing.

2. Practice using taping.

3. Figure acreage

4. Set up tripod & level

5. Record readings in field notebook.

6. Calculate cuts & fills.
7. Run a contour line.
8. Set up foundation lines, batter boards, and construction lines.

EVALUATION:

1. Practical field quizes (avoid formal classroom testing)
2. Field notebook (individual)

RESOURCES:

1. Tape, steel
2. Tripod & level
3. Rod, architects and engineers
4. Marking pins
5. String
6. Batter boards & posts
7. Nails
8. Surveyors notebooks

BIBLIOGRAPHY:

1. Brinker, Russel C., Elementary Surveying, 5th ed., International Text Book Co., Scranton, Penn., 1969
2. An Exercise in Different Leveling, VEP
3. Farm Surveying, Vocational Agriculture Service, College of Agriculture, University of Illinois, Urbana, Ill., VAS30-10
4. Surveying, Ohio Agricultural Education Curriculum Material Service, 1972
5. Use of the Level: Reading the Rod, VEP
6. Use of the Level: Setting Up the Instrument, VEP, Calif. Polytechnic State University, San Luis Obispo, Calif. 98407 d937

MEDIA:

1. ____________________
2. ____________________
3. ____________________

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Alternate Energy

LENGTH: 3 Weeks

WHEN TAUGHT: Grades 11 and 12.

OBJECTIVES: The student will be able to:

1. list several types of alternate energy.
2. list economic reasons for alternate energy.
3. understand passive construction design.
4. list practical applications.
5. read necessary information as assigned.
6. plan a field trip to view some type of alternate energy in use such as greenhouse, passive construction, windmill, showroom for stoves, hearing panels, heat exchange pumps, etc.
7. construct a small cold frames that would be used in horticulture and record daily temperatures three times per day to compare temperature gradient. (morning, noon, afternoon)
8. organize a list of temperature recorders.
9. practice safety.
10. evaluate the theory of cold frames as it could relate to other fields of agriculture for heat.

CONTENT:

I. Energy sources
    A. solar
    B. wind
    C. water
    D. electrical
    E. coal
    F. wood
    G. body
    H. chemical (battery)
    I. animal waste

II. Distribution systems
    A. passive systems
    B. stoves, fireplaces, furnaces, boilers
    C. heat pumps
    D. solar cells
    E. hydraulic ram

III. Influencing factors on energy usage

- A. storage systems
- B. solar cells
- C. insulating factors
- D. weather stripping
- E. ventilation
- F. humidity
- G. wind breaks and landscaping
- H. color
- I. latitude and season
- J. air movement
- K. location

TEACHER ACTIVITIES:

1. Present information on alternate energy.
2. Pre-order various bulletins and articles in sufficient quantity.
3. Prepare a list of possible areas for a field trip.
4. Provide necessary transportation for field trip.
5. Provide necessary materials work area, safety equipment for construction.
6. Provide working drawing for construction of cold frames.
7. Cooperate with other staff members in placing cold frames in horticulture area.
8. Provide student with proper equipment to record gradient temperatures.
9. Have class send letter of appreciation regarding field trip.
10. Keep administration informed as to progress of this program.
11. Have student relate various theories and ideas into their SOEP and FFA projects.
12. Provide a source for additional reading and advanced ideas, for those students desiring same.
13. Encourage students to write an article for local paper, National Future Farmers, etc., regarding project.
14. Encourage students to set up a display of alternate energy ideas at local fairs, shopping centers, etc.

STUDENT ACTIVITIES:

1. Prepare notebook and take notes.

2. Collect when possible bulletins and articles dealing with alternate energy.
3. Attend field trip.
4. Complete construction phase.
5. Cooperate with all instructors.
6. Follow safety procedures.
7. Keep necessary records regarding gradient temperatures.
8. Evaluate records.
9. Make evaluation and suggestions to improve course.
10. Set up display.
11. Write appreciation letters.

EVALUATION:

1. Grade notebooks and literature.
2. Grade construction project.
3. Class quizzes and exams.
4. Class participation by students.
5. Evaluate field trip - written report by each student.
6. Grade objectivity of student overall.

RESOURCES:

1. Shop and classroom areas.
2. Shop tools and equipment.
3. Textbooks and bulletins.
4. Shop supplies.
5. Transportation.
6. Field trip area.
7. Recording equipment.
8. Area for placement of cold frames.
9. Provide necessary letter, paper, and postage.

BIBLIOGRAPHY:

1. Clegg, Peter, Energy For The Home, Garden Way Publishing, Charlotte, Vermont.
2. Cooperative Extension Service, University of Connecticut, Storrs, CT., Request bulletins.
3. Noll, Edward M., Wind/Solar Energy, Howard W. Sams and Co., Inc., Indianapolis, Indiana.
4. Passive Design Ideas for the Energy Conscious Builder, National Solar Heating and Cooling Information Center, Rockville, MD.
5. Sullivan, George, Wind Power for Your Home, Cornerstone Library, New York, N.Y.
6. Whitaker, James H., Agricultural Buildings, and Structures, Reston Publishing Co., A Preston-Hall Co., Reston, VA.

MEDIA:

1. Charts and graphs.
2. Film and filmstrip.

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Concrete For Farm Use

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11, 12.

OBJECTIVES: The student will be able to:

1. select the proper materials for mixing concrete (e.g. stone, sand, cement).
2. mix concrete properly - know how much water to add per sack.
3. determine the mix required for job, #PSi/sq. ft.
4. pour concrete, construct simple forms, know how to treat form with oil or fuel.
5. strike off and trowel concrete, give concrete that desired finish (e.g. broom, smooth, semi-smooth).
6. embed bolts, edge concrete, drill holes and secure fasteners.
7. lay 8" cement blocks, know use of level and trowel.
8. mix mortar and know difference between cement and mortar.
9. calculate volume and concrete and mortar needed in advance.
10. properly clean and maintain concrete mixing equipment and hand equipment.

CONTENT:

I. Selecting materials
    A. cement
    B. aggregate
    C. test
        1. silt
        2. organic matter
    D. determining cost

II. Selecting concrete mixtures
    A. proportions of materials
    B. determining moisture
    C. estimating amount needed
    D. methods of mixing

III. Forms
    A. materials

- B. maintenance
- C. construction
- D. placing concrete

IV. Finishing

- A. walls
- B. floors and walks
- C. floating
- D. brushing and troweling
- E. curing
- F. coloring

V. Masonry

- A. block and brick types and sizes
- B. mortar
- C. laying blocks and bricks
- D. sills and lintels
- E. anchoring

TEACHER ACTIVITIES:

1. Use lecture and discussion to introduce unit.
2. Provide worksheets.
3. Provide supplies and equipment.
4. Demonstrate stone sizes and conditions of sand.
5. Demonstrate setting forms, oiling forms using farm level; set grades and set masonary string for grade lines.
6. Demonstrate mixing concrete.
7. Demonstrate pouring concrete, screeding and troweling.
8. Demonstrate finishing techniques, edging, brooming and smooth finish.
9. Demonstrate curing techniques.
10. Arrange field trip to Redi-Mix plant.

STUDENT ACTIVITIES:

1. Complete worksheets.
2. Select stone sizes, determine sand condition (%H_2O) and read cement bag label.
3. Determine strength of concrete.
4. Set forms, oil forms and embed bolts.

5. Mix concrete.
6. Pour concrete, screed, trowel, finish and edge concrete.
7. Student will cure concrete.

EVALUATION:

1. Quizzes and exam.
2. Rate project and worksheets.

RESOURCES:

1. Local hardware dealer.
2. Local Redi-Mix contractor.
3. Shop equipment.
4. Forms.

BIBLIOGRAPHY:

1. Concrete Technology Instructors Guide, Portland Cement Assoc., Chicago, IL, 1965.
2. Dalzell, J. Ralph, Concrete Block Construction, American Technical Society, Chicagp, IL.
3. Hoerner, Thomas A., Quality Concrete Construction, Hobar Publications, St. Paul, MN, 1971.
4. Making Quality Concrete for Farm Construction, Portland Cement Assoc., Chicago, IL.

MEDIA:

1. Slides -
    - A. Mr. Quality Concrete, IMS
    - B. Concrete Masonry, Farm Construction, Ohio Vocational Agriculture Service (55 slides)

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Diesel Fuel Systems

LENGTH: 3 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: Students will be able to:

1. compare the diesel engine to the gasoline and state principles of operation.
2. identify component of a diesel fuel system and state the operational function of each component.
3. identify types of combustion chambers and fuel systems.
4. know the importance of fuel filters in a diesel fuel system.
5. identify the different types of nozzles.
6. know how to use special tools to service and test nozzle.
7. identify injection pumps and how to service pumps.
8. be able to use operators' and service manuals.

CONTENTS:

I. Compare Diesel Engine to gasoline - explain increased use
   A. 2 and 4 cycle
   B. mechanical components
   C. fuel introduction
   D. compression ratios

II. Identify components of Diesel Fuel System and explain their functions
   A. fuel tank
   B. transfer pumps
   C. filters
   D. injection pumps
   E. injector nozzles
   F. fuel lines

III. Types of Combustion Chambers
   A. direct
   B. precombustion
   C. turbulence
   D. energy cell

IV. Identify types of fuel systems

- A. common rail
- B. accumulator
- C. jerk pump
- D. distributor pump

V. Explain system requirements

- A. meter
- B. atomize
- C. distribute
- D. quantity
- E. timing

VI. Identify types of nozzles

- A. pintle
- B. pentaux
- C. closes
- D. multihole

VII. Demonstrate compression test

VIII. Test nozzle

- A. opening pressure (pop off)
- B. spray pattern
- C. leakage test
- D. back leakage test
- E. safety precautions when testing

IX. Disassembly of nozzles and study componenet

X. Cleaning nozzle

- A. cleaning equipment
- B. cleaning procedure
- C. reassembly and adjustments
- D. retest
- E. reinstall - torque procedures

XI. Installation of filters

XII. Bleeding of fuel system

XIII. Type of pump

- A. unit injector
- B. inline type pump
- C. distributor type pump
- D. transfer pump

TEACHER ACTIVITIES:

1. Use of conference to present main points of objectives.
2. Use of overhead transparency to explain principles and information

3. Use of audio visual materials (filmstrips, slides, with cassette tapes and films).
4. Demonstrate disassembly and assembly of pumps, nozzles, and other components.
5. Provide components - for student use.
6. Demonstrate use of special tools.
7. Insure safety is practiced.

STUDENT ACTIVITIES:

1. Through use of notebooks, record, diagram, major points of information as explained.
2. Students will be able to complete worksheets and assignments.
3. Students will use Technical Service Manuals.
4. Students will disassemble and assemble injector nozzles, inspect for wear and damage of parts.
5. Students will disassemble and assemble injection pumps, inspect for wear and damage of parts.

EVALUATION:

1. Observation of students' work.
2. Student response to questions.
3. Completion of worksheets.
4. Safety habits.
5. Quizes and examinations.
6. Students' ability to use tools, identify parts, adjust, etc.
7. Attitudes toward completion of assignments and carry out responsibilities.

RESOURCES:

1. Vocational Agricultural Mechanics shop.
2. Diesel Tractor.
3. Reference Material.

BIBLIOGRAPHY:

1. Conklin, Glen, *Diesel Fuel Systems, Principle and Service*, Instructional Materials Service, Cornell University, Ithaca, New York
2. *Fuels & Lubricants*, Athens, CA AAVIM
3. *Fundamentals of Service - Engines*, John Deere Service Publication, Moline, Illinois 61265
4. *Red Book*, Technical Publications, Kansas City, Missouri, Operators Manuals
5. Instructional Material Service, Cornell University, Ithaca, New York
6. Technical Publications, Kansas City, Missouri, Caterpillar Corp., H.O. Penn, Newington, Connecticut

MEDIA:

1. Filmstrip, *Lubrication*, Colonial Films
2. Filmstrip, *Tractor Fuels and Lubricants*, Part I & II, Colonial Films
3. Overhead Transparencies

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Electric Motors and Controls

LENGTH: 6 Weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The student will be able to:

1. understand the principles of electricity and electric motors.
2. identify the component parts of the electric motor.
3. interpret a motor name plate.
4. wire and change leads of an electric motor.
5. maintain the different types of electric motors.
6. identify the different types of electric motors.
7. select a proper motor for the job.
8. identify types of electric controls.
9. select type of control for specific purposes.
10. read and follow direction of schmatic on available controls.
11. understand the problems involved replacing and changing controls.
12. operate the different types of controls available.

CONTENT:

I. Review basic electricity
   - A. generation and magnetism
   - B. volts, amps, watts, and kilowatts
   - C. wire sizes and fusing
   - D. circuits and polarization

II. Motor operation
   - A. operating principles
   - B. interaction of parts

III. Selection of proper motor
   - A. split phase
   - B. capacitor
   - C. repulsion-induction
   - D. universal
   - E. 3 phase

IV. Motor parts

- A. rotor
- B. stator
- C. switches
- D. leads
- E. housings
- F. bases

V. Motor control and protection

- A. changing direction
- B. changing voltages
- C. fuses, heaters, etc.

VI. Maintenance procedures

- A. proper installation
- B. oil, dust, moisture
- C. trouble shooting and repair

VII. Electrical controls

- A. need, use and terms involved with electric motor controls
- B. polarization and lead wires
- C. reading and following schmatics
- D. types of controls to be wired
    1. heater
    2. limit
    3. pressure
    4. temperature
    5. humidity
    6. photoelectric
    7. timing
    8. magnetic

TEACHER ACTIVITIES:

1. Discuss and review basic electricity.

2. Discuss types of motors and have them available to point out the differences to the student.

3. Show by slides, filmstrip, or if possible, by field trip where the different types of motors would be used.

4. Discuss parts of electric motors, showing the parts as they are discussed, as well as describing motor operation and interaction of the parts.

5. Demonstrate how to change direction of flow of electricity in order to change direction of rotation of motor, discuss why and under what conditions you would want to reverse direction.

6. Demonstrate how to maintain an electric motor and the importance of proper maintenance.

7. Take a field trip to see motor maintenance and repair.

8. Show and discuss types of controls available and their applications.

9. Show transparencies of controls which apply to the students' area of study.

10. Demonstrate applications of selected controls.

11. Demonstrate controls included in the C.L. & P. Kit.

STUDENT ACTIVITIES:

1. List in notebooks:

   A. review of basic electricity.
   B. types of motors.
   C. selection and uses of the different types of motors.
   D. nameplate information.

2. Diagram how to change direction of flow of electricity in order to change direction of rotation of motor.

3. List the parts and how to identify them.

4. List the steps for proper maintenance.

5. Study available motors, be able to describe the operation and interrelation of all parts.

6. Wire motor to reverse direction of rotation.

7. Wire motor with a safety device to prevent overload.

8. Take apart and carry out the maintenance steps on different motors.

9. Maintain motors at home or on the job.

10. Develop pictorial notebook of controls and specification which apply to selected controls.

11. Develop ability to properly elect types of controls for specific jobs.

12. Develop ability to read and follow directions of schmatic on available controls.

13. Study and identify internal components of available controls.

14. Wire and operate specific controls.

EVALUATION:

1. Spot quizzes.
2. Question students while working in the shop.
3. Evaluate students' ability to carry out practical work.
4. Evaluate student application of knowledge of electric motors on the job.
5. Pictorial notebook.
6. Questions to be answered after completion of each exercise.
7. Evaluate students' ability to select proper control in a given situation and wire it correctly.

RESOURCES:

1. School shop, tools and materials.
2. Collection of electric motors and parts.
3. Contact area business for field trips.
4. Slide/filmstrip projector.
5. Demonstration board - Electric motor components.
6. C.L. & P. Kit.

BIBLIOGRAPHY:

1. Phipps, Farm Mechanics Text and Handbook, The Interstate Printers and Publishers, Inc., Danville, IL.
2. AAAVA - Selection and Application of Electric Motors.
3. Century Co. - Todays Types of Electric Motors
   Principles of Electric Motors
   Operation and Protection
   Motor Application Guide
4. Cooperative Extension Service, University of Connecticut, Agriculture Engineering Pamphlets, Selection and Maintaining Electric Motors.
5. C.L. & P. Controls Kit Booklets and Catalogs.

MEDIA:

1. Filmstrips: AAAEVA
   - a. Electric Motors - How They Run.
   - b. Electric Motors - Selection and Application.
   - c. Electric Motors - Changing Direction of Rotation.

2. Control Kit transparencies.

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Equipment Assembly

LENGTH: 6 weeks

WHEN TAUGHT: Grades 11 & 12

OBJECTIVE: Students will be able to:

1. read plans.
2. assemble parts according to directions.

CONTENT:

I. Select machinery to assemble
    A. find machinery dealer in the area to provide machine or equipment

II. Follow directions from manufacturer
    A. assemble using correct bolts, torques, etc.
    B. utilize knowledge of specialist in the field

TEACHER ACTIVITIES:

1. Obtain equipment to assemble.
2. Observe student work.
3. Know assembly procedure.
4. Demonstrate any special assembly.

STUDENT ACTIVITIES:

1. Observe all safety rules.
2. Read all instruction prior to starting assembly.
3. Observe others working with you.
4. Double check plans and assembly specifications.

EVALUATION:

1. Notebook
2. Tests and quizes
3. Practical work

RESOURCES:

1. Shop tools and equipment
2. Dealers of equipment
3. Assembly plan sheets

BIBLIOGRAPHY:

1. Operator's Manuals
2. Parts Manuals
3. Assembly Manual

MEDIA:

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Farm Waste Disposal

LENGTH: 3 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: Students will be able to:

1. identify the laws relating to waste disposal.
2. identify the composition and value of animal waste.
3. recognize methods of handling animal waste.
4. establish suitable methods of handling waste.

CONTENT:

- I. Livestock waste management
    - A. need
    - B. public interest
    - C. public health laws
- II. Amounts and Concentrations
    - A. daily productions by different animals
    - B. properties of waste
    - C. concentrations of different types (BOD)
- III. Methods of Handling
    - A. solid
        1. stockpile and haul
        2. composting
        3. dehydration
        4. incineration
    - B. liquid
        1. haul to field
        2. aerobic treatment
        3. anaerobic treatment
        4. combination
        5. pump - irrigation system
    - C. Management system for different animals
        1. swine
        2. beef
        3. dairy
        4. poultry
        5. horses
        6. sheep

IV. Dead animal disposal

V. Construction and runoff

TEACHER ACTIVITIES:

1. Arrange field trip depicting waste disposal.
2. Secure health officials as speakers.
3. Use lecture and discussion periods to cover theory of unit content.
4. Provide student hand-outs.
5. Provide lab sheets, materials, references and exams to accomplish objectives.

STUDENT ACTIVITIES:

1. Maintain a notebook.
2. Complete lab sheets.
3. Participate in classroom activities.
4. Attend field trips.
5. Participate in practical and written exams.

EVALUATION:

1. Quizes and written test on all material.
2. Notebook and lab sheets will be evaluated.

RESOURCES:

1. Reference material.
2. Surrounding farms for field trip.

BIBLIOGRAPHY:

1. Lytle, R.J., Farm Builder's Handbook, Farmington, Michigan, Structures Publishing Co., 1975

MEDIA:

1. Overhead Transparencies
2. ____

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Fencing

LENGTH: 3 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: Student will be able to:

1. select the type of fence best adapted for the function it is to serve.
2. select the type of fence posts best adapted for the kind of fence.
3. treat post with preservatives.
4. construct fences.
5. brace end and corner post.
6. maintain and repair fences.

CONTENT:

I. Types of fences
   - A. electric
   - B. woven wire
   - C. board
   - D. barbed wire
   - E. "live"

II. Posts
   - A. types
   - B. treatment
   - C. preservatives

III. Methods of Construction
   - A. spacing
   - B. bracing
   - C. aligning
   - D. installing wire

IV. Maintaining & Repairing

TEACHER ACTIVITIES:

1. Use lecture and discussion periods to cover theory of unit content.

2. Provide student hand-outs when appropriate.
3. Arrange field trip.
4. Prepare shop projects and problems to provide skill training.
5. Provide samples of material.
6. Provide actual fence construction experience.
7. Provide lab sheets, equipment, references and exams to accomplish objectives.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture & discussion.
2. Complete lab sheets.
3. Participate in classroom discussion.
4. Perform practical activities on fencing.
5. Attend field trip.
6. Complete practical and written exams.

EVALUATION:

1. All practical projects will be evaluated.
2. Quizzes and written test on all content.
3. Notebook and lab sheets will be evaluated.

RESOURCES:

1. Samples of materials.
2. Preservatives.
3. Reference material.
4. Surrounding farms for field trips.

BIBLIOGRAPHY:

1. Phipps, Lloyd J., et al., Farm Mechanics Text and Handbook, Danville, Ill., The Interstate Printers and Publishers, Inc. 1959
2. Building Farm Fences, Athens, GA, American Association For Agricultural Engineering and Vocational Agriculture

3. Planning Farm Fences, Athens, GA, American Association For Agricultural Engineering and Vocational Agriculture

MEDIA:

1. Film strip - Planning Farm Fences, Colonial Films

2. Overhead transparencies

3. ____

4. ____

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Field Machines (Operation and Adjustment)

LENGTH: 6 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: Students will be able to:

1. identify the various types of field machines by the function they perform.
2. operate field machines common to agricultural interests in the region properly and safely.
3. select proper field machine for proper job.
4. correctly adjust field machines common to regional agricultural interests.
5. use owners manuals properly and maintain machine properly.
6. purchase field machines (rent).
7. safely transport the machine.
8. prepare machines for storage.
9. plan replacement and management schedules for machines.

CONTENT:

I. Field Machine Identification by Function

  A. tillage systems - types and adjustment, operation, and maintenance

    1. plows
    2. harrows
    3. cultivators (including rotary hoe)

  B. planting and fertilizing systems (cultural) - types, adjustments (calibration), operation, maintenance

    1. planters and seeders
    2. manure spreaders
    3. fertilizer spreaders
    4. sprayers

  C. harvest systems - types, adjustment, operation, maintenance

    1. hay
    2. corn
    3. grain
    4. special harvesting equipment

- D. transportation systems - types, adjustment, operation, maintenance
  - 1. trailers
  - 2. loaders and lifts
- E. other special machines

II. Field Machine Operation and Adjustment

- A. familiarization
  - 1. visit local agribusinesses to discuss machines
  - 2. demonstration of machines by farmers
  - 3. owners manual information
  - 4. safe operation procedures
- B. field operation
  - 1. lease - borrow equipment from farms or dealers
  - 2. land laboratory, student or SOEP crop/land use
- C. adjustment, calibration
  - 1. special applications - sprayers, spreaders
  - 2. population monitoring

III. Machine Management

- A. machine procurement
  - 1. buy, lease, replace
  - 2. sell
- B. maintenance and depreciation, record keeping, FFA
- C. transportation
- D. storage

TEACHER ACTIVITIES:

1. Present information on field machines to be covered.
2. Demonstrate operation and adjustment of field machines.
3. Provide field trips to local farms/agribusiness places, dealers.
4. Provide land and/or crops to demonstrate machines.
5. Incorporate students' SOEP and FFA into class work.
6. Provide owners manuals, machine literature, and audio-visual for class reference.

STUDENT ACTIVITIES:

1. Prepare notebook on field machines common to area.
2. Collect literature on field machines.
3. Bring in machines to use in class/lab activities.
4. Attend field trips.
5. Operate and adjust machines covered in class.
6. Identify area machinery dealers.
7. Keep management records on machines for SOEP and FFA.

EVALUATION:

1. Graded notebook and literature.
2. Class quizzes and exam.
3. Participation evaluation.

RESOURCES:

1. Student machinery.
2. Agribusiness/equipment dealers.
3. School shop and equipment.
4. Department AV, reference materials.
5. Land and crops in area
6. Student and teacher knowledge.

BIBLIOGRAPHY:

1. Bainer, R. et al, Principles of Farm Machinery, John Wiley and Sons, N.Y.
2. Smith, H.P., Farm Machinery and Equipment, McGraw-Hill, N.y.
3. Stone, A. et al, Machines for Power Farming, Johy Wiley & Sons, N.Y.
4. National Agriculture Occupations Competency Study
5. New Hampshire Agriculture Curriculum Guide

MEDIA:

1. Filmstrip series on machinery operation.
2. overhead transparencies
3. 16 mm film - Machinery Operation, I.H. & Deere

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Hydraulics

LENGTH: 3 weeks

WHEN TAUGHT: Grade 11 & 12

OBJECTIVE: Students will be able to:

1. recognize basic principles of hydraulics and how hydraulic systems work.
2. identify the parts of a hydraulic system.
3. compare hydraulic systems.
4. determine the uses of hydraulic systems in agriculture.
5. diagnose a hydraulic system.
6. perform hydraulic maintenance.
7. identify and use hydraulic tools properly.

CONTENT:

I. Hydraulic Principles
    A. liquid characteristics
    B. how a hydraulic system works
        1. pump
        2. cylinder
        3. reservoir
        4. check valves
        5. relief valves
        6. control valve
    C. open-center system
    D. closed-center system
    E. variations of open and closed systems

II. Hydraulic Uses
    A. steering systems
    B. brake systems
    C. load sensing
    D. leveling systems

III. Pumps
    A. displacement
    B. types
    C. efficiency
    D. malfunctions
    E. diagnosing failures

IV. Valves

- A. types
- B. operation
- C. failure and remedies
- D. repair
- E. trouble shooting

V. Cylindars

- A. types
- B. extra features
- C. seals
- D. testing, diagnosing and maintenance

VI. Hydraulic Motors

- A. function
- B. displacement and torque
- C. types
- D. application and efficiency
- E. selection
- F. malfunctions
- G. diagnosing and maintenance

VII. Accumulators

- A. uses
- B. types
- C. servicing and pre-charging

VIII. Filters

- A. the how and why of filters
- B. types
- C. filtration and contamination
- D. maintenance

IX. Hydraulic support systems

- A. reservoirs
- B. oil coolers
- C. hoses
- D. pipes, tubes and couplers
- E. seals
- F. fluids

X. General Maintenance

- A. importance of cleanliness
- B. safety measures
- C. cleaning and flushing
- D. filling
- E. leaks
- F. overheating

XI. Diagnosis and Testing

A. basic steps
B. testing the machine
C. trouble-shooting

TEACHER ACTIVITIES:

1. Use lecture and discussion periods to (a) provide students with theory of hydraulics, (b) acquaint students with hydraulic systems, (c) introduce and demonstrate all practical aspects of hydraulics.

2. Provide students with hand-outs on the functioning of hydraulic systems.

3. Demonstrate the operation of hydraulic systems, maintenance, and repair.

4. Provide actual student experience with actual systems.

5. Prepare shop problems and projects to provide skill training.

6. Provide lab sheets, materials, equipment, references and exams to accomplish objectives.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture and discussion.

2. Complete lab sheets.

3. Participate in classroom discussion.

4. Perform practical activities on actual equipment.

5. Participate in a practical and written exam.

EVALUATION:

1. All practical projects will be evaluated.

2. Quizes and written test on all material.

3. Trouble-shooting evaluation.

4. Lab sheets will be evaluated.

RESOURCES:

1. Vo-Ag agricultural mechanics shop.

2. Hydraulic parts and tools.

3. Tractor and equipment

4. Reference material.

BIBLIOGRAPHY:

1. American Association for Agricultural Engineering and Vocational Agriculture (AAAE & VA), Tractor Hydraulics, Coordinator's Office Agricultural Engineering Building, Athens, Georgia

2. American Association for Vocational Instructional Material (AAVIM), Hydraulic Systems for Tractors and Other Mobile Equipment, Care & Operation Vol. 1, AAVIM, 120 Engineering Center, Athens, Georgia, 30602

3. Deere & Company, Fundamentals of Service - Hydraulics, Moline, Ill.

4. Owners' Manual

MEDIA:

1. Slide set and tape. Hydraulics (FOC)
2. Overhead transparencies.
3. Hydraulic Parts.
4. Tractors & Equipment.

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Independent Shop Projects

LENGTH: 6 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The student will be able to:

1. repair or construct shop project.
2. develop skills through application.
3. work on project with limited supervision.

CONTENT:

- I. Develop and present plan for approval
- II. Procure equipment, materials and supplies
- III. Prepare a budget and cost effective plan

TEACHER ACTIVITIES:

1. Work with student to develop project plans.
2. Provide instruction and supervision is required.

STUDENT ACTIVITIES:

1. Develop plan.
2. Present plan for approval and assistance.
3. Bring in equipment, materials and supplies.
4. Prepare a budget.
5. Turn out a finished project.

EVALUATION:

1. Completed project.
2. Use of tools and materials.
3. Selection of resources used.
4. Use of safety practices.

RESOURCES:

1. Home operation
2. Equipment dealers

3. Vocational Agriculture Facility

BIBLIOGRAPHY:

1. As appropriate.

MEDIA:

1. As appropriate.

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Power Trains & Transmissions

LENGTH: 3 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: Student will be able to:

1. understand fundamental principles of mechanical systems.
2. understand how power trains work.
3. identify types of gears and where they are most commonly used.
4. identify gear wear.
5. understand clutch.
6. identify types of clutches.
7. know basic clutch troubles and causes.
8. understand mechanical transmissions.
9. understand hydraulic assist transmissions.
10. understand hydrostatic drives.
11. understand differential.
12. know types of PTO.
13. trouble shoot components of power trains.
14. make necessary adjustments on components of power trains.
15. know procedures of general maintenance.
16. disassemble and repair various components of power trains.

CONTENT:

I. Gears
    A. types
    B. tooth wear & failure
    C. adjustments
        1. backlash
        2. end play

II. Clutch
  - A. pressure plate
  - B. spring tension
  - C. warp
  - D. spline wear
  - E. adjustments

III. Bearings
  - A. pilot
  - B. release

IV. Hydrostatic Drives

V. Power Take-Off

VI. Differentials

VII. Trouble shooting

VIII. General Maintenance

TEACHER ACTIVITIES:

1. Use of conference to present main points.
2. Use of overhead transparency to explain principles and material.
3. Use of audio-visual materials.
4. Demonstrate adjustments and maintenance procedures.
5. Provide materials - components for student use.
6. Demonstrate use of special tools.
7. Emphasize safety in all operations.

STUDENT ACTIVITIES:

1. Record through use of notebook points as explained by teacher.
2. Complete worksheets and assignments.
3. Use Technical Service Manuals.
4. Inspect parts of wear, etc.
5. Make adjustments.
6. Repair as necessary.

EVALUATION:

1. Observation of students' work.
2. Completion of worksheets.
3. Safety habits.
4. Quizes and examinations.
5. Students' ability to make adjustments.
6. Students' ability to maintain systems.
7. Students' attitudes toward proper completion of assignments.
8. Students' ability to diagnose and make repair.

RESOURCES:

1. Vocational Agriculture Mechanics Shop
2. Power train parts and tools
3. tractors
4. reference material
5. parts and repairs manuals

BIBLIOGRAPHY:

1. Deere & Company, FOS: Power Trains, Moline, Illinois
2. Technical Service Manuals, All companies
3. Tractor Transmissions, Athens, GA, American Association for Agricultural Engineering and Vocational Agriculture

MEDIA:

1. Transparencies FOS: Deere & Company
2. Slides, Clutches, International Harvester

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Private Water Supplies & Septic Systems

LENGTH: 3 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: Student will be able to:

1. determine the water needs for his family and situation.
2. identify the various sources of water.
3. select the type of well best suited to his needs.
4. locate the most desirable site for a well.
5. check all sanitation precautions.
6. understand the establishment of catchments, cisterns and ponds, and the development of springs.
7. identify the types, installation and operation of the various pumps and pressure tanks.
8. identify the qualities and functions of plumbing needed.
9. identify the factors that govern water quality.
10. sample and test or have tested his home water supply.
11. identify types of septic systems.
12. determine size of septic systems.
13. determine condition of septic systems.
14. exhibit a knowledge of septic system maintenance.

CONTENT:

I. Water Quantity
    A. calculate needs for family use.
    B. calculate needs for livestock.
    C. calculate needs for crop irrigation.

II. Water Sources
    A. hydrologic cycle
    B. ground water - water table
    C. aquifers

III. Types of Water Storage
    A. wells

  - B. catchments & cisterns
  - C. ponds
  - D. springs

IV. Water Quality

  - A. factors affecting water quality
  - B. chemical analysis
  - C. bacteriological analysis
  - D. treating to improve quality

V. Pumps, Pressure Tanks and Piping

  - A. shallow - well, deep - well, positive displacement

VI. Septic Systems

  - A. types
  - B. size
  - C. tanks & leaching fields
  - D. raised systems
  - E. function
  - F. maintenance

TEACHER ACTIVITIES:

1. Demonstrate calculations for determining family livestock and crop needs for water.
2. Show visual of hydrologic cycle and explain.
3. Describe and show examples of types of wells.
4. Show by newspaper accounts of housing developments sources of contamenation.
5. Explain how and where catchments, cisterns and ponds are used.
6. Assign a report as to how each student's water supply is obtained.
7. Describe various types of pumps and demonstrate action where possible.
8. Invite speaker to discuss septic systems.
9. Provide material for construction of a model septic system.
10. Provide reference material.
11. Demonstrate taking water samples.
12. Demonstrate water testing.

STUDENT ACTIVITIES:

1. Solve problems to determine water quantity.
2. Draw from memory essential points of hydrologic cycle.
3. Find out what water source he uses at home.
4. Describe operation of pump at home water supply.
5. Take sample of water used at home.
6. Test or have tested sample for water quality.
7. Construct a model septic system.

EVALUATION:

1. Quizes given weekly on material covered.
2. Diagram of water leaving strata and type of well used.
3. Calculate answers to problems concerning water needs and settings for pressure tanks.
4. Evaluate practical work.

RESOURCES:

1. Various types of pumps secured from plumbers.
2. Test equipment for water quality.
3. Vocational Agriculture shop.
4. Reference material.

BIBLIOGRAPHY:

1. Connecticut State Department of Health, Sections 19-13-B51a to 19-13-B51l, Water Supply Wells
2. Home Water Supply Treatment, Cooperative Extension Service, College of Agriculture and Natural Resources, University of Connecticut
3. Private Water Supplies, Franklin M. Foote, M.D., P.H. Commissioner, CT State Dept. of Health, Hartford, CT
4. Private Water Systems, Midwest Plan Service, Iowa State University , Ame, Iowa

5. Testing and Improving the Home Water Supply, Cooperative Extension Service, College of Agriculture and Natural Resources, University of Connecticut, Storrs, CT
6. Water Systems, Athens, GA, American Association for Vocational Instructional Material

MEDIA:

1. Filmstrip - Farm Water Systems - NASCO
2. Slides - Planning the Electric Water System and Plumbing, USDA
3. Overhead Transparencies

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Small Gasoline Engines Repair and Overhaul

LENGTH: 6 Weeks

WHEN TAUGHT: Grade 11 or 12.

OBJECTIVES: The student will be able to:

1. understand the basic terms of engine theory.
2. understand the operating principles and how small gasoline engines are classified.
3. recognize the major parts of air cooled engines.
4. understand fuel systems and air cleaners including types and general maintenance.
5. maintain, adjust, disassemble, reassemble and repair carburetor.
6. understand the parts and their function of the magnetic ignition system.
7. understand basic electricity and its importance to small gasoline engines.
8. disassemble, repair and reassemble ignition systems.
9. read and understand owner's mannuals and service manuals.
10. trouble-shoot small gasoline engines.
11. sharpen and balance blade.
12. disassemble and reassemble engines.

CONTENT:

I. Gasoline engine fundamentals

   A. definition of a gasoline engine
   B. fuel
   C. operating principles
   D. cycle
   E. valve overlap
   F. power output
   G. comparison of engines
   H. classification of engines
   I. gasoline engine parts
   J. evaluation

II. Carburetion

   A. general information

      1. purpose

        2. atmospheric pressure
        3. venturi
        4. airfoil

    B. gravity feed (flow-jet)
    C. flow-jet evaluation
    D. vacu-jet systems
    E. pulsa-jet systems
    F. vacu-jet and pulsa-jet evaluation
    G. air cleaners

III. Ignition

- A. basic electricity
- B. magnetic systems
- C. testing spark
- D. spark plugs
- E. ignition disassembly, identification and assembly
- F. ignition evaluation

IV. Manuals and identification

- A. owners' manual
    - 1. warranty
    - 2. importance
    - 3. contents
- B. engine numenclature
- C. service manuals
    - 1. parts identification
    - 2. deference numbers
    - 3. part numbers
    - 4. cost determination

V. Trouble-shooting

- A. general engine information
    - 1. ignition
    - 2. fuel systems
- B. major problems

VI. General information

- A. safety rules and regulations
- B. blade conditions
- C. winter storage
- D. normal maintenance

VII. Major disassembly

- A. general
- B. carburetor
- C. ignition
- D. crankshaft
- E. governor parts
- F. connecting rod and piston
- G. cylinder and valves
- H. cleaning

VIII. Assembly

- A. crankshaft
- B. pings, piston and connecting rod
- C. cam gear
- D. governor and miscellaneous parts (oil splasher)
- E. tappetts and valves
- F. ignition system
- G. cylinder head and shield
- H. carburetor and linkage
- I. adjustments

TEACHER ACTIVITIES:

1. Use lecture and discussion periods to acquaint students with fundamentals of engine theory, carburetion, ignition, manuals, safety and engine disassembly and reassembly.
2. Demonstrate all disassembly, repair and reassembly.
3. Provide students with engines to perform all aspects of the theory presented on the engines.
4. Provide the necessary lab sheets, materials, equipment, references and exams to accomplish objectives.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture and discussion.
2. Complete lab sheets.
3. Participate in classroom discussion.
4. Perform practical mechanical activities in order to accomplish objectives.
5. Read and interpret engine manuals.
6. Test ignition systems.
7. Disassemble, repair, reassemble and adjust engines.
8. Sharpen and balance blades.

EVALUATION:

1. All practical projects will be evaluated.
2. Quizzes and written tests on all material.
3. Lab sheets will be evaluated.

RESOURCES:

1. Vo-ag agricutlural shop.
2. Engines.
3. Test equipment.
4. Service manuals.

BIBLIOGRAPHY:

1. Anderson, Edwin P., Audels Gas Engines Manual, New York: Theo-Audels and Co., 1963.
2. Automotive Electric Association, AEA Training Manual, Detroit, Michigan, 1968.
3. Briggs and Stratton 4 Cycle Air-Cooled Engines Repair Instructions, Milwaukee, Wisconsin, Briggs and Stratton Corp.
4. Briggs and Stratton General Theory of Operation, Briggs and Stratton Corp, Milwaukee, Wisconsin.
5. Crouse, William H., Automotive Mechanics, McGraw-Hill Book Co., Inc., New York, 1960.
6. Phelon, R.E., What Makes the Spark, East Longmeadow, MA.
7. Phipps, Lloyd J., et al, Farm Mechanics Test and Handbook, Danville, IL, The Interstate Printers and Publishers, Inc. 1959.
8. Phipps, Lloyd J., et al, Workbook in Farm Mechanics, The Interstate Printers and Publishers, Inc., 1959.
9. Small Engines Service Manual, Kansas City, MO., Technical Publications, Inc., 1979.

MEDIA:

1. Overhead transparent working models.
2. Briggs and Stratton Small Engine charts.

3. Briggs and Stratton slides:

    A. aluminum engine overhaul
    B. start-stop and store
    C. engine check-up
    D. valves and seats
    E. resizing cylinders
    F. bearing replacement

4. Ignition working model.

3. Arrange field trips to provide on-site observation.
4. Prepare shop problems and projects to provide skill training.
5. Provide actual construction experience for students.
6. Provide lab sheets, materials, equipment, references and exams to accomplish objectives.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture & discussion.
2. Complete lab sheets.
3. Participate in classroom discussion.
4. Perform practical activities on construction projects.
5. Attend field trip.
6. Participate in a practical and written exams.

EVALUATION:

1. All practical projects will be evaluated.
2. Quizes and written test on all material.
3. Notebook and lab sheets will be evaluated.

RESOURCES:

1. Vocational Agriculture mechanics shop.
2. Samples of materials.
3. Reference material.
4. Surrounding communities for field trips.

BIBLIOGRAPHY:

1. Ahrens, Donald L., Concrete and Concrete Masonry, St. Paul, Minn. Hobar Publications, Inc. 1976
2. Brann, Donald R., Forms, Footings, Foundations & Framing, Briarcliff Manor, NY, Directions Simplified, Inc., 1978
3. Lytle, R.J., Farm Builder's Handbook, Farmington, Mich., Structures Publishing Co., 1975

4. Phipps, Lloyd J., et al., Farm Mechanics Text and Handbook, Danville, Ill., The Interatate Printers and Publishers, Inc., 1959
5. Siegele, H.H., Concrete Construction, Chicago, Ill., Frederick J. Drake & Co., 1955
6. VanGaasbeek, Richard, Roof Framing, Chicago, Ill., Frederick J. Drake & Co.
7. Wallace, Asby, Modern Farm Buildings, Englewood Cliffs, NJ, Prentice-Hall, Inc.
8. Rafter Layout, St. Paul, Minn, Hobar Publications

MEDIA:

1. Overhead transparencies
2. Material samples
3. Filmstrip - Laying Concrete Masonry - NASCO
4. Filmstrip - Planning Machinery Layout - Colonial Films
5. Filmstrip - Galvanized Roofing & Siding - NASCO
6. Filmstrip - Cutting Common Rafters - Colonial Films
7. Filmstrip - Concrete Walks
8. Slides - Kinds of Lumber - NASCO
9. Slides - Foundations For Your Home - NASCO

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Tractor Engine Overhaul

LENGTH: 6 Weeks

WHEN TAUGHT: Grade 11 or 12.

OBJECTIVES: The student will be able to:

1. use diagnostic procedures to initially trouble shoot engines.
2. correctly remove and mount an engine on a rebuild stand.
3. determine serviceability of the clutch pack components.
4. determine serviceability of the ring gear.
5. demonstrate the ability to use a ridge reamer.
6. correctly remove pistons and determine serviceability.
7. determine serviceability of connecting rods, wrist pins and upper rod bushings when applicable.
8. correctly measure cylinders and determine serviceability.
9. correctly measure crank and play and gear backlash. Also check visibility of timing marks.
10. determine serviceability of crankshaft and camshaft.
11. demonstrate skills for servicing or replacing valve components using proper tools and equipment.
12. properly reassemble and adjust engine components.

CONTENT:

I. Diagnostics

   A. operator information
   B. exhaust - color and density
   C. engine noises
   D. oil pressure
   E. water temperature
   F. blowby
   G. external leaks
   H. compression tests - dry and wet
   I. dynamometer test if available

II. Remove and mount engine on stand

   A. clean tractor
   B. remove accessories

- C. drain oil and coolant
- D. split tractor at bellhousing and front assembly
- E. mount engine on stand
- F. remove pan and oil pump

III. Clutch pack inspection and repair

- A. visually and manually inspect (i.e. bearings)
- B. replace as needed

IV. Determine serviceability of ring gear

- A. inspect and replace if necessary

V. Valve train

- A. removal of head
- B. inspect for warping, cracks, erosion, etc.
- C. inspection, measuring and servicing of valves, guides, seats and springs
    1. causes of failures
    2. valve seat refacer
    3. valve grinder
    4. installation of new seats and guides
    5. check seat and valve face contact
- D. inspection, measuring and servicing of other components
    1. cam followers
    2. valve springs
    3. valve lifters
    4. rocker arm bushings
    5. valve rotators
    6. rocker arm shaft
    7. push rods

VI. Connecting rods, wrist pins and bushings

- A. check for distortion and fatigue of rods
- B. measure pins and bushings where applicable
- C. press out rod bushings

VII. Ridge reaming and piston removal

- A. remove ridge
- B. remove pistons
- C. ID rod caps
- D. remove rings
- E. clean pistons thoroughly
- F. inspect and measure

VIII. Cylinders

A. measure bore
B. visually inspect for scoring, cracks, etc.
C. replace liners of bore and hone

IX. Camshaft

A. inspect and measure
B. measure endplay and timing gear backlash
C. check timing marks and cap ID
D. grinding and straightening

X. Camshaft removal and service

A. inspect and measure journals, lobes, bearings and followers

XI. Engine block

A. cleaning - steam, acid, etc.
B. inspect for cracks and distortion

XII. Block reassembly

A. install cam bearings, followers, lifters and camshaft
B. install crankshaft with bearings and torque with plasti-gauge
C. check timing marks before covering
D. install rings on pistons after assembly to rods - torque rod caps to specifications
E. install rebuilt or serviced oil pump, gasket and pan
F. install clutch pack with new throwout bearing and pilot bearing

XIII. Engine run-in

A. check for leaks initially and after engine is up to operating temperature
B. check oil pressure, water temperature, charging circuit and radiator for blowby
C. recheck all connections

TEACHER ACTIVITIES:

1. Lecture.

2. Demonstrate to students the use of technical and parts manuals.

3. Demonstrate all major steps in disassembly and reassembly to avoid accidents and costly mistakes.

4. Use unserviceable components previously collected to show cause and effect.

5. Use of industry movies and other AV materials.

STUDENT ACTIVITIES:

1. Inspect and clean an engine.
2. Diagnose and determine service requirements.
3. Rebuild engines to the fullest extent using recommended procedures with all other work done by a competent machine shop.
4. Gain experience in ordering correct parts, using manuals and service request forms.

EVALUATION:

1. Work to be checked daily on each engine.
2. Quizzes and exams
3. Rate work and safety habits.
4. Rate success of engine starting and operating correctly with minimum of reworking.

AGRICULTURAL MECHANICS CURRICULUM

UNIT: Tractor Maintenance

LENGTH: 5 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The student will be able to:

1. recognize basic functioning of various tractor systems.
2. demonstrate preventive maintenance on a tractor.
3. demonstrate various maintenance jobs on tractors.
4. use tractor operator's manual.
5. demonstrate safe practices in tractor operation.

CONTENT:

I. Systems - functions, parts identification and repair.
    A. electrical
    B. cooling
    C. fuel
    D. power train
    E. lubrication
    F. ignition
    G. hydraulic

II. Operator's manual use and understanding

III. Preventive maintenance

IV. Daily maintenance

V. Safety

TEACHER ACTIVITIES:

1. Obtain tractors for practical work in shop.
2. Explain maintenance jobs done on tractors, how and when to do them.
3. Explain the functioning and identification of systems and parts.
4. Develop exercises for student shop work.
5. Assist students in doing tractor maintenance jobs.
6. Develop group demonstration.

STUDENT ACTIVITIES:

1. Student will learn about fuels, oils and grease.
2. Student will learn the functioning and maintenance of the following systems:
   - A. electrical
   - B. cooling
   - C. fuel
   - D. power train
   - E. lubrication
   - F. ignition
   - G. hydraulic
3. Students will do skill exercises to learn tractor maintenance techniques.
4. Students will learn to use test equipment.
5. Students will learn safe tractor operation.

RESOURCES:

1. Vocational Agriculture shop and equipment.
2. Field trip to tractor dealer.
3. Tractors for shop work.

BIBLIOGRAPHY:

1. Brown, Tractor and Small Engine Maintenance, Interstate
2. Farm Tractor Tune-up and Service Specifications, AAVIM, Athens, Georgia
3. FMO Manual on Tractors, John Deere Co., Moline, Ill.
4. Tractor Hydraulics, AAVIM, Athens, Georgia
5. T & I Service Manuals, Technical Publications
6. Tractor Maintenance, AAVIM, Athens, Georgia, Oct. 1964
7. Tractor Operation & Daily Care, AAVIM, Athens, Georgia,1965
8. Tractor Transmissions, AAVIM, Athens, Georgia
9. 4-H Tractor Care & Safety Program, Extension Service

MEDIA:

1. 16 mm films:
   - A. Tender Loving Care - Ideal A.V. Service
   - B. Transmissions - Ideal A.V. Service
   - C. Built to Eat Acres Not Fuel - Ideal A.V. Service
   - D. Farm Tractor Safety - Farm Film Foundation
   - E. Target: Tractor Safety - Deere & Co.
   - F. John Deere Roll Card - Deere & Co.
2. Film Strips:
   - A. University of Nebraska Series of 6 Film Strips on preventive maintenance
   - B. Lubrication - Colonial Films
   - C. Spark plugs - Colonial Films
   - D. Tractor Valves - Colonial Films
3. Slides:
   - A. Tractor Electrical Systems - Deere & Co.
   - B. Hydraulics - Deere & Co.
   - C. Power Train - Deere & Co.
4. Transparencies

ANIMAL SCIENCE CURRICULUM

UNIT: Beef Cattle

LENGTH: 6 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: Student will be able to:

1. identify 10 breeds of beef.
2. identify segments of beef industry.
3. demonstrate proper methods and requirements needed in feeding beef.
4. identify digestive anatomy of beef.
5. identify anatomy of reproduction in beef.
6. establish proper breeding systems and care as related to beef.
7. recognize proper health and sanitation related to beef animals.
8. recognize beef diseases.
9. become familiar with proper marketing and handling of beef cattle.
10. fit and show beef animals properly.
11. identify proper housing for beef animals.
12. identify careers in beef industry.

CONTENT:

I. Beef Cattle Industry
   A. beef industry in Connecticut
   B. beef industry in United States

II. Beef Breeds
   A. English breeds (Angus, Hereford)
   B. American breeds (Polled Hereford, Santa Gertrudis)
   C. exotic breeds (Charolais, Simmental)

III. Feeding Beef Cattle
   A. digestive system
   B. nutrient requirements
   C. common feeds used
   D. rations for beef
   E. feeding systems

F. economics related to feeds and feeding

IV. Breeding Beef Cattle

A. male reproduction
B. female reproduction
C. artificial breeding
D. care during gestation
E. parturition
F. breeding systems

V. Beef Health and Sanitation

A. detecting and controlling beef diseases
B. detecting and controlling beef parasites
C. detecting and controlling poisonous plants for beef

VI. Marketing Beef Cattle

A. major segments of beef industry
B. marketing classes
C. systems for handling beef cattle
D. castrating, dehorning, and injecting beef

VII. Housing for Beef

A. constructing buildings for beef
B. electricity for beef buildings
C. plumbing for beef buildings
D. concrete construction
E. economics of building

VIII. Fitting and Showing Beef

A. fitting beef
B. showing beef
C. training beef

IX. Selecting Beef Cattle

A. parts of beef animal
B. judging conformation
C. age, health, breeding, and production records

TEACHER ACTIVITIES:

1. Prepare and give lectures.

2. Demonstrate skills and procedures students must perform.

3. Plan field trips to study beef animals.

4. Arrange for speakers.

5. Use audio-visual aids.

STUDENT ACTIVITIES:

1. Maintain notebooks.
2. Answer study questions.
3. Work with beef animals.
4. Perform skills that relate to beef animals.
5. Keep records on beef projects.
6. Find work experience in beef.

EVALUATION:

1. Review notebooks.
2. Quizzes and tests.
3. Evaluate skill proficiency.
4. Give pre-tests and post-tests.
5. Observe on the job.

RESOURCES:

1. Extension Service
2. Local beef farmers
3. UConn personnel
4. Textbooks on beef
5. Any equipment for use with beef animals, i.e., fitting and showing equipment
6. Student projects

BIBLIOGRAPHY:

1. Ensminger, M.E., Beef Cattle Science, Interstate Printers & Publishers
2. McClay, David R., National Ag Occupations Competency Study. U.S. Dept. of H.E.W.
3. "An Emperical Determination of Tasks Essential to Successful Performance as a Beef Farmer", Dept. of Ag. Ed.
4. Beef Cattle, California Vocational Agriculture Curriculum Guidelines

5. Career Preparation in Ag Production, U.S. Dept. of H.E.W.

6. Doane's Farm Management Guide, Doane's Ag Service, Inc.

7. USDA Publications

MEDIA:

1. Slides

A. Judging Angus Beef	Nasco
B. Disease of Feeder Cattle	Nasco
C. Cutability Live Beef	Nasco
D. Beef Cattle Body Type	Nasco
E. Cattle Reproduction	Nasco

2. Filmstrips

A. Judging Beef	Nasco
B. Fitting & Showing Beef	Nasco

3. Overheads

4. Any movies available on beef, i.e., Beef Breed films.

ANIMAL SCIENCE CURRICULUM

UNIT: Breeding and Genetics

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, anytime.

OBJECTIVES: The student will be able to:

1. identify parts of male and female reproductive tracts and their functions.
2. identify signs of heat.
3. develop and plan a breeding program for an animal.
4. learn care of animal at parturition.
5. understand basic genetics.

CONTENT:

I. Identification of reproductive parts

    A. male parts
    B. female parts

II. Identify signs of heat

    A. cattle
    B. horses
    C. swine
    D. sheep and goats

III. Developing and planning a breeding program

IV. Artificial insemination

V. Care of animal at parturition

    A. signs
    B. care

VI. Basic principles of genetics

    A. dominance
    B. recessives
    C. linebreeding
    D. inbreeding
    E. crossbreeding
    F. phenotypic-genotypic rations

TEACHER ACTIVITIES:

1. Use lecture periods to explain terms and reproductive function.

2. Use charts or animals to identify parts.
3. Use pictures or animals to demonstrate heat.
4. Prepare materials for students to use in developing breeding program.
5. Use animals or pictures to demonstrate parturition care and signs.
6. Explain and demonstrate basic genetics.

STUDENT ACTIVITIES:

1. Maintain notebooks on information presented.
2. Fill in charts on reproductive parts.
3. List signs of heat and parturition.
4. Plan and develop a breeding wheel or chart for an animal.
5. Care for animals at parturition or talk to vet about it.
6. Raise own animals at school.

EVALUATION:

1. Students are pre and post tested.
2. Students' notebooks are graded.
3. Student are graded on breeding projects.

RESOURCES:

1. Artificial insemination technician.
2. Veterinarian.
3. Slaughterhouse.
4. Breeding farms.
5. Farm managers.

BIBLIOGRAPHY:

1. Ensminger, E.M., Stockman's Handbook, Interstate.
2. Haez, Reproduction in Farm Animals.
3. Lasley, John, Genetics of Livestock Improvement.
4. Roediger, Roger D., Livestock Breeding, Ohio Ag. Education Curriculum Materials Service.

MEDIA:

1. Slides, movies from NASCO and IMS.
2. Reproductive tracts, slaughterhouse, NASCO.
3. Transparencies,(Texas)

ANIMAL SCIENCE CURRICULUM

UNIT: Dairy Management

LENGTH: 3 weeks or 6 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: Student will be able to:

1. identify the major breeds of dairy and their characteristics.
2. select mature and replacement animals.
3. house, feed and breed cows, heifers, bulls, and calves.
4. be familiar with routine management, such as vaccination, testing, etc.
5. understand lactation, milk production curves, and parturition.
6. operate and manage milking systems.
7. understand the marketing procedures and economic cycles.
8. fit and show a dairy cow.
9. identify major health problems and establish a herd health program.
10. be familiar with types of record keeping systems and interpretation of these records.

CONTENT:

- I. Dairy Industry
  - A. types of dairy systems
    - 1. commercial
    - 2. purebred
    - 3. replacement
  - B. Range of Industry
    - 1. consumption of dairy products
    - 2. size of industry in Connecticut
    - 3. size of industry in United States
- II. Dairy Selection
  - A. parts of cow
  - B. breed terminology
  - C. type and conformation
    - 1. production records
    - 2. show ring criteria
    - 3. live evaluation

- D. breeds of cattle
- E. purebred vs. commercial

III. Feeding Dairy Cattle

- A. digestive system
- B. nutrient requirements
- C. common feeds
- D. rations

    1. high producers
    2. heifers
    3. dry cows
    4. young stock

- E. feeding systems
- F. feed cost and economics

IV. Management

- A. dehorning
- B. brucellosis testing
- C. TB test
- D. restraints
- E. castration
- F. veal production
- G. removal rudimentary traits
- H. identification

    1. ear tags
    2. freeze brand
    3. neck chains

V. Breeding

- A. heat cycles
- B. artificial insemination
- C. gestation
- D. lactation
- E. parturition
- F. breeding systems
- G. bull management
- H. use breeding wheel
- I. selection of bull

VI. Milking Procedures

- A. types of systems
- B. milking practices
- C. sanitation procedures
- D. mastitis prevention, testing, and treatment
- E. storing of milk

VII. Health Problems

- A. Common diseases

    1. bloat

2. milk fever
3. scours
4. pneumonia
5. ketosis
6. external/internal parasites

B. Preventative health programs

VIII. Housing

A. types

1. stanchion vs. free stall

B. calf housing
C. confinement vs. pasture
D. equipment

1. breeding chutes
2. head gates
3. squeeze shots
4. creeps
5. fencing
6. feeding equipment

E. ventilation
F. space requirements

IX. Record keeping

A. basic

1. production
2. breeding
3. health
4. accounts

B. DHIA
C. other record system

1. ELFAC

X. Marketing

A. price trends
B. methods of marketing milk

1. co-ops

C. cattle markets

D. veal production

XI. Fitting and Showing

A. training
B. grooming
C. showing

TEACHER ACTIVITIES:

1. Class lecture.
2. Arrange for field trips to dairy farms.
3. Class lab, and field demonstrations.
4. Guest speakers.
5. Distribute handouts on management.
6. Obtain Audio Visual Equipment.

STUDENT ACTIVITIES:

1. Maintain notebook.
2. Develop a dairy farm operation.
3. Participate in field trips.
4. Answer study questions and problems.
5. Develop breeding wheel.
6. Develop a dairy ration.

EVALUATION:

1. Review notebooks
2. Quizzes
3. Evaluate field trip reports.
4. Homework assignments.
5. Project grade.

RESOURCES:

1. Local dairy farmers
2. Veterinarians
3. DeLarel Milking Systems
4. Milk Promotion Services, Inc., South Windsor, CT

BIBLIOGRAPHY:

1. Ensminger, Dairy Science
2. Hoard's Dairyman, Pub. W.D. Hoard and Sons Co., Fort Atkinson, Wis. 53538
3. Dairy Farm Management, Quinn, Thomas, Delma
4. Merch Veterinary Manual

MEDIA:

1. "Raising Calves in Iambic Pentameter" Slides - IMS
2. ____________________
3. ____________________
4. ____________________

ANIMAL SCIENCE CURRICULUM

UNIT: Dairy Products

LENGTH: To be offered in 3,6,9, and 12 week units, depending on need and interest.

WHEN TAUGHT: Grades 11 & 12

OBJECTIVES: The student will be able to:

1. understand the processing of milk and milk products.
2. make basic dairy products on a small scale.
3. establish an appreciation for quality control in dairy products to include milk, cheese and other manufactured products of the dairy industry (ice cream).
4. understand Federal, State and local regulations pertaining to the milk industry.
5. understand retail sales of milk to include State regulations for pasteurization and homogenization of milk.
6. determine quality products and to note causes of undesirable products.

CONTENT:

I. Pasteurization and homogenization of milk
   - A. the plant and equipment
   - B. the licensing of operators
   - C. techniques and methods
   - D. regulations, Federal, State and local.

II. Related Dairy Products
   - A. I.D. the common types of cheese, domestic and imported.
   - B. understanding the various processes of cheese making.
   - C. quality of cheeses
   - D. yogurt
   - E. ice cream manufacturing terms and processing

III. Producing and marketing of quality Dairy products
   - A. quality control at the farm
   - B. quality control at the milk plant
   - C. quality control through education of employees at distributive centers
   - D. quality control through consumer education

IV. Tests for Evaluation of Whole Milk, Skim Milk, Ice Cream, Cream Yogurt and Cheeses
   - A. butterfat testing

B. solids for milk testing
C. protein testing
D. tests used for pricing (an understanding) for dairy products and the marketing orders

V. Scoring and Evaluating Dairy Products

A. off flavors and odors
B. observation ("eye appeal")
C. contaminants
D. microbial

TEACHER ACTIVITIES:

1. Lecture and lead discussion.

2. Provide samples from the following areas:

A. farms
B. local plants
C. stores
D. schools
E. home

3. Arrange field trips to:

A. large milk processing plant
B. ice cream plant
C. by products plant
D. state laboratory

4. Obtain films on:

A. marketing
B. salesmanship
C. microbiology
D. nutrition

5. Arrange for outside speakers

A. market expert - on packaging
B. small ice cream outlet speaker
C. food and drug speakers

STUDENT ACTIVITIES:

1. Maintain notebook

2. In labs, test for:

A. fats
B. total solids
C. bacteria
D. sediment
E. adulterants

  - F. flavors and odors
  - G. nutrition

3. Process on small scale
   - A. butter
   - B. cottage cheese
   - C. ice cream

4. Participate in judging contests
   - A. local
   - B. State
   - C. regional
   - D. national

EVALUATION:

1. Student demonstrations.

2. Student notebook assignments.

3. Unit exams.

4. Student projects of making product.

RESOURCES:

1. Dept. of Health - State

2. Dept. Foods & Drugs - Federal

3. Dept. Foods & Nutrition - University of Connecticut

4. Dept. Dairy Manufacturing - University of Connecticut

5. National Companies:
   - A. National dairies
   - B. Bordens dairies
   - C. General Food Corp.
   - D. United Fruit

6. A.D.A. - American Dairy Association

7. W.H.O. - World Health Organization

8. State Department of Agriculture Personnel

BIBLIOGRAPHY:

1. Judkins, H.F., Keener, H.A., Milk Production & Production, John Wiley, Sons, Inc. New York 1966

2. Petersen, W.E., Dairy Science, J.B. Lippincott Company, N.Y. 1950

3. Pamphlets and Periodicals from supportive organizations.

MEDIA: 1. ______________________________

ANIMAL SCIENCE CURRICULUM

UNIT: Goat Management

LENGTH: 3 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The Student will be able to:

1. identify the major breeds of goats.
2. select a goat for production purposes.
3. identify opportunities available in the goat industry.
4. properly house, feed and manage a goat enterprise.
5. properly feed and care for a goat and be able to recognize basic health care problems.
6. outline a breeding program to maintain both milk production and herd replacements.

CONTENT:

I. The Goat Industry
    A. range and scope
    B. opportunities full and part time
    C. value of products
        1. milk
        2. meat (kid & chevon)

II. Goat Selection
    A. parts of a goat
    B. breed terminology
    C. proper type and conformation
        1. for milking
        2. for meat
        3. the buck
    D. production

III. Breeding
    A. breeding season
    B. gestation
    C. natural or artificial breeding
    D. care during gestation
    E. parturation

IV. Milk Production

A. milking equipment & stands
B. proper milking techniques
C. proper milk handling
D. how long to milk
E. milking and/or allowing kids to nurse

V. Raising Kids

A. care at birth
B. feeding till weaning
C. feeding after weaning
D. housing

VI. Management Practices

A. castrating
B. horn disbudding
C. hoof trimming
D. teeth
E. worming
F. types of records

VII. Health Problems

A. internal parasites
B. external parasites
C. disease
D. poisoning (plants & chemicals)

VIII. Feeding Goats

A. the goat's stomach
B. the dry goat
C. the producing goat
D. the buck

IX. Handling & Housing

A. pen construction
B. hay racks
C. exercise yards
D. fencing

X. Fitting and Showing (optional)

A. training
B. grooming
C. showing

TEACHER ACTIVITIES:

1. Class lecture.
2. Class and lab demonstrations of management skills.
3. Field trips to:
    A. large operation
    B. small scale operation
4. Guest speakers:
    A. local goat producer
    B. vet relating to health problems
5. Class discussion.
6. Design (build) in class, a milking stand for goats.
7. Design in class, a barn yard housing set up for a small herd of goats.
8. Use audio-visual aids.

STUDENT ACTIVITIES:

1. Maintain notebook, with hand-outs and class notes.
2. Develop a check list of management practices.

EVALUATION:

1. Quiz.
2. Tests.
3. Performance on field trips.
4. Note book review.

RESOURCES:

1. Extension Services.
2. Local goat farms.

BIBLIOGRAPHY:

1. Belanger, Jerry, Raising Milk Goats the Modern Way, Garden Way Publishing Co., Charlotte, Vermont
2. Countryside, publication 12 times a year, Countryside, Waterloo, Wisc., 53594

3. Dairy Goats, Breeding, Feeding, Management, Cooperative Extension, College of Agriculture, Univ. of Mass., Publ. #439, (available through Cooperative Ext. College of Ag., Univ. of CT).

4. Dairy Goat Journal, P.O. Box 1908, Scottsdale, AR., 85252, Publication 12 times a year.

MEDIA:

1. The Dairy Goat Kit; Vocational Education Productions, California Polytechnic State Univ., San Luis Obispo, California. 2 filmstrips and cassettes: Dairy Goat Management; Fitting and Showing Goats.

2. Livestock Judging Set #7: Vocational Education Productions, California Polytechnic State Univ., San Luis Obispo, Calif., Kit contains class of each of the major dairy breeds.

ANIMAL SCIENCE CURRICULUM

UNIT: Horses and Horsemanship

LENGTH: 6 weeks

WHEN TAUGHT: Grade 11 or 12, fall or spring

OBJECTIVES: The student will be able to:

1. identify breeds of horses by class and type.
2. identify parts of a horse.
3. how to handle, ride, and work around horses safely.
4. identify common diseases and unsoundnesses of horses.
5. understand how to control internal parasites of horses.
6. understand how to saddle and bridle a horse.
7. compare horses to an accepted standard and select desirable horses.
8. appreciate the benefits to be derived from sound horse management.
9. identify the value of good horse grooming.
10. understand the necessity for good tack care.
11. demonstrate how to properly feed horses.
12. identify proper housing and equipment for horses.
13. understand proper hoof care for horses.

CONTENT:

I. General Overview of the following areas:

   A. origin and development of horses
   B. population distribution of horses
   C. breeds, breed associations, types and characteristics

II. Specific instruction in the following areas:

   A. parts and anatomy of the horse and measuring size.
   B. safety in:

      1. catching, handling and leading
      2. bridling, saddling and mounting
      3. riding and working

C. diseases of horses, blemishes, parasites

1. respiratory
    - a. heaves
    - b. roaring
    - c. strangles
    - d. colds and influenza
    - e. equine distemper

2. digestive
    - a. colic
    - b. impaction
    - c. poisonings

3. other infectious diseases
    - a. colitis
    - b. tetanus
    - c. equine encepholomyelites (sleeping sickness)
    - d. equine infectious anemia (swamp fever)
    - e. rabies
    - f. piroplasmosis
    - g. tying up syndroms

4. blemishes
    - a. muscle inflamations
    - b. wounds
    - c. leg and foot ailments
        1. splints
        2. ringbone
        3. osselet
        4. hoof cracks
        5. founder
        6. sidebone
        7. bowed tendon
        8. spavins
        9. thoroughpin
        10. corns
        11. windpuffs
        12. copped elbow
        13. copped hock

5. foal diseases
    - a. streptococci infections
    - b. sleeper (duming) foals
    - c. jaundice (neonetal isoerythrolysis)

6. parasites

    a. botts
    b. strongyles - large and small
    c. ascarids
    d. pinworms
    e. piroplasmosis
    f. flies, lice, ticks and mange

7. lameness and stiffness - prevention and cure

III. Tack for pleasure horses

A. types of bridles & nomenclature of parts

    1. hackamores
    2. weymouth bridle
    3. pelham bridle
    4. split-eared bridle

B. types of bits and nomenclature of parts

    1. weymouth curb bit
    2. pelham curb bit
    3. walking horse bit
    4. snaffle bit
    5. deerace bit
    6. hackamore bit
    7. roper curbed cheek bit
    8. spade mouth bit
    9. liver pool bit
    10. bar bit
    11. hoof-cheek snaffle bit
    12. padded breaking bits

C. types of saddles & nomenclature of parts

    1. western
    2. english

D. optional and extra equipment

    1. blankets
    2. nosebands
    3. martingales
    4. breast plate

E. harness for driving

    1. trotters
    2. pacing

F. riders clothing

    1. english
    2. western
    3. hunting and jumping

- G. how to bridle, saddle or harness a horse
- H. care of tack

IV. Selection and judging horses (use 4-H horse score card)
Use actual judging field trips

- A. desirable general appearance
- B. desirable head and neck
- C. desirable forequarters
- D. desirable body
- E. desirable rearquarter
- F. desirable way of going (action)

V. General Management of horses

- A. housing and bedding & manure handling
- B. feeding
  - 1. roughage
  - 2. concentrates
  - 3. computing needs
  - 4. balancing rations
- C. watering
- D. fencing
- E. breeding
  - 1. basic physiology
  - 2. estrous cycle
  - 3. handling horses for breeding
  - 4. care of pregnant mare
- F. care of mare and foal at foaling
- G. care of foals
- H. grooming

VI. Hoof Care

- A. parts of the foot
- B. how to trim feet
- C. importance of professional shoeing
- D. preventing hoof dryness

VII. Costs of keeping a horse

- A. feed costs
- B. tack costs
- C. health care costs
- D. boarding a horse - economics

VIII. Buying a horse

- A. selection by conformation (see IV above)
- B. pedigree evaluation
- C. performance records

- D. evaluating temperament
- E. riding the horse - evaluating performance
- F. estimating age by teeth

IX. Horse Vices

- A. kicking
- B. biting
- C. cribing
- D. weaving
- E. stable walking
- F. halter pulling
- G. wind sucking
- H. rubbing
- I. bolting
- J. shying
- K. balking
- L. rearing
- M. run-aways

X. Horse gaits

- A. natural
    1. walk
    2. trot
    3. gallup, including leads
- B. man taught
    1. fast walk
    2. rack
    3. pace
    4. canter, including leads

XI. Train horses

- A. haltering & leading
- B. sacking
- C. bridling & driving
- D. longeing
- E. saddling
- F. mounting
- G. body positioning & pressures

TEACHER ACTIVITIES:

1. Classroom lectures and discussions.

2. Field trips for demonstrations.

3. Field trips for practice judging.

4. Field trips for basic equitation instruction.

5. Field trip for hoof trimming demonstration.
6. Use appropriate films, film strips, and slides.

STUDENT ACTIVITIES:

1. Classroom discussions based on pupil's experience.
2. Compiling notebooks of class and field trip notes.
3. Practice judging of live horses.
4. Practice caring for tack.
5. Practice bridling, saddling and harnessing.
6. Conduct taught management practices on students' horse projects where employed.
7. Practice basic equitation.

EVALUATION:

1. Weekly written quizzes on material covered.
2. Evaluation of student conduct and practices around horses on field trips.
3. Written Unit final exam.
4. Grading of notebooks kept.

RESOURCES:

1. Area Farrier
2. Local Veterinarian
3. Miscellaneous horse equipment owned by school
4. Area horse owners and horse faunal ranches
5. Students horses at home projects
6. Personnel of Animal Husbandry Dept., U-Conn
7. Agricultural extension persons

BIBLIOGRAPHY:

1. Coggins, Jack, The Horsemans Bible, Doubleday 1966
2. Ensminger, M.E., Horses and Horsemanship, Interstate Printers, Danville, Illinois, 1963.
3. Harper, Frederick, Top Farm Book of Horse Care, Popular Library, New York, 1966

4. Kays, D.J., The Horse, Holt, Rinehart and Winston, New York, 1961

5. Kelly, J.F., Dealing With Horses, Arco Publishing Co., N.Y., 1961

6. Morrison, Frank B., Feeds and Feeding, abridged 9th edition, Morrison Publishing Company, Clinton, Iowa 1958

7. National 4-H Service Committee, Inc. "Horses and Horsemanship", 1965, Available from Agricultural Extension Offices.

8. Thorpe, Richard, "Pleasure Horse Management," A. I. 360 Paper, Ray School, Moodus, Conn. 1969

9. U-Conn Extension Bulletin #58-4, "The Pleasure Horse". 1964

MEDIA:

1. ________________________________

2. ________________________________

3. ________________________________

4. ________________________________

ANIMAL SCIENCE CURRICULUM

UNIT: Livestock Judging

LENGTH: 3 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The student will:

1. Develop an understanding of desired traits in beef, sheep, pigs, dairy cattle, and horses.
2. Develop the ability to select animals based on ideal types for marketing and breeding.
3. Develop and understand why we select specific types of animals for specific purposes.
4. Visually evaluate livestock.
5. Place a class of each species and justify the placings.
6. Write reasons to justify placings.
7. Score judging cards.

CONTENTS:

I. Review Terminology
   - A. parts of each species
   - B. terms applied for male, females, and castrated males of each species
   - C. market terms which apply to each species
   - D. market weights, grading, and classifications of each species
   - E. performance terms used for horses

II. Discussion of desired conformation for each species
   - A. balance
   - B. muscling
   - C. reproductive traits
   - D. structural correctness
   - E. special considerations
     - 1. way of going
     - 2. udder qualities in dairy cows
     - 3. temperment
     - 4. under saddle horse classes

      - a. requirements of the class
      - b. requirements of the horse

III. Judge classes of each species

  - A. market
  - B. breeding
  - C. special classes for horses
    - 1. pleasure
    - 2. performance

IV. Scoring of Judging Cards

  - A. explanation of score
  - B. explanation of cuts
  - C. calculation of cuts and scoring of cards

TEACHER ACTIVITIES:

1. Use lecture periods to review parts and terminology and ideal conformation.

2. Prepare handouts with conformation and reasons terminology.

3. Prepare picture, slide and arrange farm visits for judging classes.

4. Provide samples of oral reasons in handout form and on tape.

5. Listen to oral reasons.

6. Correct written reasons.

7. Provide prompt scoring of judging cards.

8. Discuss placings and reasons for placings.

STUDENT ACTIVITIES:

1. Maintain a notebook for notes and filing of handouts.

2. Judge market, breeding and performance classes for all species.

3. Write reasons and give oral reasons.

EVALUATION:

1. Review notebooks.
2. Judge and score classes.
3. Reason scores.
4. Periodic quizzes.

RESOURCES:

1. Slide series from Texas, Ohio. IMS and most other Audio-Visual supply services.
2. Picture classes from Breed associations, Hoard's Dairyman, and audio-visual supply services.
3. Farms in area.
4. Livestock Judging workshops at the University of Connecticut or those put on in conjunction with breed association field days.
5. University of Connecticut Field Days.
6. Booklets from state extension services on livestock judging.
7. Local breed or extension livestock judging contests.
8. Agricultural Fairs or livestock shows.

BIBLIOGRAPHY:

1. Beeson, W., Livestock Judging and Evaluation, Interstate Press
2. Ensminger, Horses and Horse Science
3. Hartman, D.A., Dairy Cattle Judging Made Easy, N.Y. State College of Agriculture
4. Hunsley, Roger E., Livestock Judging and Evaluation, Cooperative Extension Service, Purdue University, Lafayette, Indiana

MEDIA:

1. ______________________________

2. ______________________________

3. ______________________________

4. ______________________________

ANIMAL SCIENCE CURRICULUM

UNIT: Meat Science

LENGTH: 3 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The student will:

1. have an understanding of the importance of meat as a food and it's contribution to human nutrition.
2. have a knowledge of the meat inspection system and it's contribution to public health.
3. understand grades and the grading systems as they relate to the livestock and meat industry.
4. provide some background, understanding and skill in meat handling, processing and meat merchandising.
5. develop an understanding of meat cookery methods and meat carving.

CONTENT:

I. Introduction

   A. what to accomplish
   B. lab safety
   C. knife sharpening

II. Live animal evaluation - Pre-slaughter handling

III. Inspection - Slaughtering

IV. Field trip to slaughterhouse

V. Yield grading and quality grading

VI. Classwork in yield grading and quality grading

VII. Field trip to plant to yield and quality grade

VIII. Breakdown of all 4 species "Meat Identification by the Basic Seven."

IX. Beef and veal retails - Breakdown of beef

X. Cutting beef

XI. Review veal - Cutting veal

XII. Lamb retails - Cutting lamb

XIII. Pork retails - Pork cutting

XIV. Curing, smoking, processing

XV. Preservation, packaging, labeling

XVI. Marketing

XVII. Cooking methods

XVIII. Bar-B-Que (cutting test due date)

IXX. Review

XX. Exam

TEACHER ACTIVITIES:

1. Use lecture periods to explain the meat factors to explain the meat industry.
2. Demonstrate the procedures for grading and meat handling along with lab safety.
3. Plan field trips to study the meat industry.
4. Use lecture periods to discuss the differences within the species and cutting tests.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture and discussion sessions.
2. Answer study questions to be assigned periodically.
3. Cut meat and take cutting tests.
4. Make interpretations from their own cutting test.

EVALUATION:

1. Review notebooks periodically.
2. Evaluate student learning with quizzes.
3. Have student demonstrate laboratory techniques.
4. Check results of cutting test at end of unit.

RESOURCES:

1. Livestock Conservation, Inc.
   405 Exchange Building
   Chicago, Ill,

2. Information Division
   Farmer Cooperative Service
   USDA
   Washington, CT

3. National Livestock Conservation, Inc.
   19 West Chicago Avenue
   Hinsdale, Ill. 60521

4. National Livestock Conservation, Inc. Information Office
   602 Livestock Exchange Building
   Omaha, Nebraska 68107

5. Animal and Plant Health Service
   Hyattsville, MD 20781

6. Superintendent of Documents (Farmer Building)
   United States Printing Office
   Washington, DC 20402

7. Vocational Education Producers
   California St. Polytechnical College
   San Louis Obispo, Calif. 93401

8. Cooperative Extension Service
   College of Agriculture and Natural Resources
   University of Connecticut
   Storrs, CT 06268

9. Teacher Library, Inc.
   15 Columbus Circle
   New York, NY 10023

10. Perspective on Sausage Bulletin
    Oscar Mayer & Company
    Madison, Wisconsin 53701

11. American Meat Institute for "Career Opportunities in the
    Meat Packing Industry"
    Washington, DC 20250

12. National Livestock and Meat Board
    444 North Michigan Avenue
    Chicago, Ill. 60611

BIBLIOGRAPHY:

1. Romans and Ziegler, The Meat We Eat, The Interstate Printers & Publishers, Inc.

2. Lessons on Meat, National Live Stock and Meat Board.

MEDIA:

1. ____________________

2. ____________________

3. ____________________

4. ____________________

ANIMAL SCIENCE CURRICULUM

UNIT: Poultry Management

LENGTH: To be offered in 6, 9, and 12 week units depending on need and interest.

WHEN TAUGHT: Grades 11 or 12

OBJECTIVES: The student will be able to:

1. understand skills related to chick embryo development and hatching.
2. understand breeding and development of poultry breeds and strains.
3. establish a complete understanding of poultry nutrition.
4. acquire skills in judging and evaluation of live poultry, egg quality and dressed quality.
5. be familiar with and know management skills relative to diseases of poultry.
6. understand marketing poultry and poultry products.
7. develop knowledge relative to types of equipment and housing needs for modern poultry industry.

CONTENT:

I. Structure of the Chicken and Formation of the Egg
    A. the various body systems of the bird: feathering, skin, muscle, skeleton, etc.
    B. the formation and physiology of egg formation and production
    C. composition of the egg including shape, size, color, yolk, white and shell

II. Principles of Poultry Breeding
    A. hatchability
    B. systems of breeding
    C. egg production
    D. hereditary, basis of improvement

III. Selection Methods
    A. pedigree selection including an understanding of inheritable traits
    B. relation of selection and culling process, physical characteristics

C. pigmentation and molting

IV. Incubation

A. selecting eggs for hatching
B. care of hatching eggs
C. development of the chick
D. optimum conditions for incubation, effects of temperature, position of the eggs, oxygen requirements

V. Brooding and Rearing

A. brooding requirements
B. capon production

VI. Houses and Equipment

A. ventilation, design, insulation, construction materials
B. poultry house equipment, watering, laying cages, and styles of poultry

VII. Nutrient - Feeding Requirements

A. requirements for maintenance
B. requirements for growth
C. requirements for egg production
D. ration components

VIII. Diseases and Control

A. nature of disease
B. prevention of disease
C. when disease outbreaks occur
D. diseases of young chickens, pullorum, bronchitis, coccidiosis, etc.
E. common diseases of hens
F. poultry parasites

IX. Marketing Eggs and Dressed Poultry

A. egg quality and control
B. geographic considerations
C. market classes and grades of poultry
D. cutting, handling, wrapping processed poultry

TEACHER ACTIVITIES:

1. Classroom lectures and discussions.

2. Arrange laboratory demonstrations for hatching, raising chicks, nutrition, caponizing, candling, dressing and butchering, and judging

3. Field trips for viewing housing & equipment.

4. Field trip for judging.

STUDENT ACTIVITIES:

1. Work laboratory assignments as listed under Teacher Activities.

2. Share related SOEP activities.

3. Secure feed tags and other related materials.

4. Compile appropriate notes.

5. Develop 2 plans of operation for a phase of poultry management. (Example: hatchery, raising pullets, producing table eggs, marketing poultry products, etc.)

EVALUATION:

1. Review through periodic quizes.

2. Handout assignments per individual.

3. Judging and other laboratory exercises.

4. Students have small poultry project where applicable.

RESOURCES:

1. Local poultry operations, field trips.

2. University Extension.

3. National Poultry Institute.

4. Feed Companies.

5. Hatcheries

   A. Arbor Acres
   B. Hall Bros.

6. Visual Aides and Overheads.

BIBLIOGRAPHY:

1. Card, Leslie E., Poultry Production

2. Diggins, Bundy, Livestock Production

3. Peterson, Christensen, Nelson, Working in Animal Science

4. Feedstuffs, Minneapolis, Minnesota

5. Poultry Digest, Sea Isle City, New Jersey

MEDIA: 1. ______

ANIMAL SCIENCE CURRICULUM

UNIT: Sheep Production

LENGTH: 3 or 6 weeks

WHEN TAUGHT: Grade 11 or 12, January-March

OBJECTIVES: Student will be able to:

1. be familiar with the sheep industry.
2. select sheep.
3. house, breed, and feed sheep.
4. demonstrate routine management practices.
5. identify diseases and parasites effecting sheep and their prevention, cure-control.
6. lamb out ewes and care for a newborn lamb.
7. be familiar with various kinds of records.
8. understand marketing procedures for sheep products.
9. fit and show sheep.

CONTENT:

I. Sheep Industry

  A. types of operations

    1. feeder
    2. purebred
    3. market lambs
    4. commercial

  B. range of industry

    1. consumption of sheep products
    2. size of industry in Connecticut
    3. size of industry in the United States

II. Sheep Selection

  A. parts of sheep
  B. breed terminology
  C. breeds of sheep and their characteristics
  D. type and conformation
  E. production records
  F. purebred vs. crossbred
  G. show ring trends

III. Feeding Sheep

- A. digestive system
- B. nutrient requirements
- C. common feeds
- D. rations for:

    1. market lambs
    2. flushing
    3. lactating ewes
    4. gestation
    5. rams in breeding season

- E. feeding systems
- F. economics related to feeding sheep

IV. Breeding

- A. heat cycles and breeding season
- B. management of ewes/rams
- C. gestation
- D. care during gestation
- E. estrus synchronization
- F. parturition
- G. care of newborn lamb
- H. lambing systems

V. Management practices

- A. castration
- B. docking
- C. tagging
- D. crotching out
- E. shearing
- F. restraints
- G. vaccinations
- H. hoof trimming

VI. Health Problems

- A. common diseases

    1. tetanus
    2. vibriosis
    3. white muscle disease
    4. scours

- B. parasites

    1. external
    2. internal

- C. establish preventive health program

VII. Housing

- A. types of systems

        1. pasture
        2. sheds
        3. confinement

    B. lambing pens
    C. feeding equipment
    D. fencing
    E. equipment

        1. creeps
        2. trimming stands
        3. scales

    F. ventilation

VIII. Marketing

    A. price trends
    B. market weights
    C. types of markets
    D. grades of lamb/mutton
    E. wool markets and pricing
    F. outlook for future

IX. Fitting & Showing

    A. training
    B. growing
    C. showing

TEACHER ACTIVITIES:

1. Plan at least two laboratory work periods per week.

2. Plan to house at least two sheep at the Vocational Agriculture facility for the duration of this unit.

3. Plan at least two field trips to sheep enterprises to discuss management practices.

STUDENT ACTIVITIES:

1. Maintain a notebook.

2. Answer study questions relating to each problem area.

3. Participate in all laboratories.

EVALUATION:

1. Review notebooks periodically.

2. Evaluate student learning with quizzes.

3. Have student demonstrate management techniques.

4. Evaluate student performance in laboratories.

5. Check results at end of unit with a post-test.

RESOURCES:

1. Contact the local extension office for publications relating to units in sheep production.
2. Invite representatives from the Connecticut Sheep Breeders Association to give short talks to class. (For current officers and directors call Dr. L. A. Malkus, U-Box 40, Univ. of CT, Storrs, CT 486-2636)
3. Invite sheep producers to discuss sheep management and industry problems with the class. Lists of producers in CT are available from the Connecticut Sheep Breeders Association.
4. List of Materials:

   A. two sheep (lambs or ewes)
   B. scale for weighing
   C. feed and bedding
   D. buckets
   E. shears - electric and hand
   F. cards and other show equipment (contact a sheep breeder in your area to help you out here)
   G. needles and syringes for demonstration (work with veterinarian in area)
   H. feed samples
   I. registration papers
   J. flock record cards
   K. Drover's Journal or similar market type publication.

BIBLIOGRAPHY:

1. Beeson, W. Malcolm, Livestock Judging and Evaluation, Danville, Ill, The Interstate Printers and Publishers Inc., 1970
2. Cole, H.H., Animal Agriculture, San Francisco, W.H. Freeman and Co. 1974
3. Collins, Spalman B., Profitable Sheep, New York, The MacMillan Co., 1956
4. Ensminger, M.E., Animal Science, Danville, ILL., The Interstate Printers and Publishing, Inc., 1969
5. Ensminger, M.E., Sheep and Wool Science, Danville, Ill., The Interstate Printers and Publishing, Inc., 1969
6. Newsom, I.E., Sheep Diseases, Baltimore, The Williams and Wilkins, Co. 1954
7. Scott, George, The Sheepmans Production Handbook,Denver, CO, Abegg Printing 1975

8. Simmons, Paula, Raising Sheep the Modern Way, Charlotte, VT Garden Way Publishing , 1976

9. The Production and Marketing of Sheep In New England, Coop. Extension Service, Pub. #66, Storrs, CT 1975

10. Working in Animal Science, by Peterson, Christensen, and Nelson, Gregg/McGraw-Hill, Inc. 1978

MEDIA:

1. Video tape cassettes on sheep management. Available from Dr. L.A. Malkus, Box U-40, University of CT, Storrs, CT 06268 486-2636

2. Sheep films available from the American Sheep Producers Council, 2000 Clayton Street, Denver, CO.

3. VEP Sheep Management Filmstrip Series

4. ____

ANIMAL SCIENCE CURRICULUM

UNIT: Small Animals

LENGTH: 3 weeks

WHEN TAUGHT: Grades 11 & 12

OBJECTIVES: The student will be able to:

1. demonstrate techniques for individual study.
2. set up and operate a small animal project.
3. work with and handle small animals.
4. demonstrate the skills involved with small animal housing, feeding and selection.
5. identify sanitation and other preventive procedures involved with small animal health.
6. keep records and record analysis.
7. demonstrate skills of marketing the products involved with small animals.
8. learn the overall considerations involved in decision making related to small animals.

CONTENT:

I. Habits
    A. life cycle; life span
    B. mating season or habits; gestation period
    C. general living habits

II. Use and/or product

III. Housing
    A. construction types
    B. space per animal
    C. environment effects
    D. feeding area
    E. bedding

IV. Selection
    A. considerations
    B. breeding

V. Feeding
    A. requirements
    B. feeding habits

VI. Handling and Care

VII. Diseases

- A. types
- B. treatment
- C. preventions

VIII. Costs

- A. things which effect costs
- B. expenses
- C. records
- D. marketing

IX. Other information which will assist in having correct management practices.

X. Animals which could be studied

- A. bees
- B. rabbits
- C. ducks
- D. geese
- E. goats
- F. guinea pigs
- G. mink
- H. hampsters
- I. dogs
- J. cats

TEACHER ACTIVITIES:

1. Set up notebook for unit (encourage pictures, drawings); discuss and outline the different small animals - brief description of each; discuss and outline the various areas of study related to small animals.

2. Discuss and outline the purposes of housing, types of housing, space required.

3. Prepare housing at school

4. Discuss and demonstrate different types of feed (concentrates, supplements and roughage) and their nutrient make-up.

STUDENT ACTIVITIES:

1. Using outline, investigate the best feed for their animal.

2. Discuss outline, investigate and record reasons for selection.

3. Set up record system in notebook (expenses, receipts, unpaid labor); make all entries to date; care for animals.

4. Discuss holding, carrying, working around, daily chores, etc.; demonstrate (teacher, then students); investigate their animal for variation during that animal's life span.

5. Discuss considerations, such as types of health problems, treatments and prevention; teacher illustrate with the animals how healthy animals look; demonstrate sanitation methods (daily chores).
6. Sanitize cages; follow all preventive methods; keep notebooks up-to-date.
7. Outline breeding schedules and long-range plans.
8. Discuss possible products and marketing of the small animals.

EVALUATION:

1. Written evaluation, one each for:
    - A. housing
    - B. selection
    - C. feeding
    - D. health
        - a. final written evaluation on the entire unit.
2. Oral & Practical Evlauation
    - A. daily
    - B. final oral & practical on handling and care
3. Notebooks
    - A. daily
    - B. final
4. Evaluation of personal conduct during:
    - A. individual study
    - B. field trips

RESOURCES:

1. Overhead projector, transparencies
2. Feed dealer
3. Students with small animals
4. Feed
5. Cages
6. Sanitation equipment

BIBLIOGRAPHY:

1. Hunter, J.M. & Scholes, Profitable Duck Management, Beacon Milling Co., Inc. 9th edition, Cayauga, N.Y.
2. Ives, Paul, Domestic Geese and Ducks, Orange Judd Publishing Company, Inc., N.Y.
3. Shaw, Frank & Eckert, John E., Beekeeping, Macmillian Co., New York 1960
4. Whittehead, Stanley B. & Shaw, Frank, Honey Bees & Their Management, D. Van Nostrand Company, Inc. New York 1951
5. Winter, A.R. & Funk, J.M., Poultry Science and Practice, J.P. Lippincott Company, N.Y. 1960
6. Chinchilla Raising, Leaflet No. 266, U.S.D.A.
7. Man's Best Friend, National Geographic Book of Dogs, National Geographic Society, R.R. Donnelly & Sons Co., Chicago, Illinois 1966
8. Raising Rabbits, U.S.D.A. Farmer's Bulletin No. 2131, Revised 1964
9. Your Dairy Goat, University of California Agricultural Extension Service
10. Your Dog, Beacon Milling Company, Cayuga, N.Y. 9th edition

MEDIA:

1. ____________________
2. ____________________
3. ____________________
4. ____________________

ANIMAL SCIENCE CURRICULUM

UNIT: Swine Management

LENGTH: 6 weeks

WHEN TAUGHT: Grade 11 or 12, anytime during year

OBJECTIVES: Student will be able to:

1. identify the major breeds of hogs and their characteristics.
2. select market hogs and breeding animals.
3. house, breed and feed brood sows, boars, feeder pigs and market hogs.
4. be familiar with routine management practices such as iron shots, castration.
5. identify diseases and parasites effecting hogs and their prevention, cure and control.
6. identify types of record keeping systems and interpretation of these records.
7. understand the marketing procedures for various hog products as well as the economic cycles in hog production.
8. fit and show a hog.
9. care for a litter of pigs.
10. prepare a sow for farrowing.

CONTENT:

I. Hog Industry

   A. types of operations

      1. feeder
      2. purebred
      3. farrowing to finishing

   B. range of industry

      1. consumption of hog products
      2. size of industry in Connecticut
      3. size of industry in United States

II. Hog Selection

   A. parts of hog

B. breed terminology
C. type and conformation

    1. production records

D. breeds of hogs
E. purebred vs. crossbred
F. show ring trends

III. Feeding Swine

A. digestive system
B. nutrient requirements
C. common feeds
D. rations

    1. feeders
    2. gestation
    3. lactating sows
    4. market hogs

E. feeding systems
F. economics related to feeding hogs
G. garbage fed hogs

IV. Breeding

A. heat cycles and breeding season
B. management of sow/boars
C. gestation
D. care during gestation
E. parturition
F. breeding systems
G. farrowing systems

V. Management practices

A. castration
B. clipping needle teeth
C. iron shots
D. restraints
E. weaning
F. sanitation
G. management of litter

VI. Health Problems

A. common diseases

    1. cholera
    2. brucellosis

B. internal parasites
C. external parasites
D. establishing preventative health program

VII. Housing

- A. types of pens
- B. types of systems
    - 1. confinement
    - 2. slatted floors
    - 3. pasture
- C. equipment
    - 1. farrowing pens
    - 2. fencing
    - 3. creeps
    - 4. feeding equipment
- D. ventilation

VIII. Marketing

- A. price trends
- B. market weights
- C. types of markets
- D. grades of pork
- E. grading live hogs
- F. outlook for future

IX. Fitting and Showing

- A. training
- B. grooming
- C. showing

TEACHER ACTIVITIES:

1. Class lecture.

2. Class and lab demonstrations of management skills.

3. Field trips.

4. Guest speakers.

5. Handouts on management, housing plan, etc.

6. Use A-V equipment
    - A. management filmstrips
    - B. slides on conformation

STUDENT ACTIVITIES:

1. Maintain notebook.

2. Develop a hog farm operation based in classroom and practical experience.

3. Participate in laboratory experiences and field trips.

4. Answer study questions and problems.

EVALUATION:

1. Review notebooks.
2. Quizzes.
3. Field trip reports.
4. Homework assignments.
5. Project grade.

RESOURCES:

1. Cooperative Extension Services
    - A. livestock extension specialist
    - B. county agents
2. Local hog farmers
3. Veterinarians
4. Magazines

BIBLIOGRAPHY:

1. Beeson, W.M., Hunsley, R.E., Nordby, J.E., Livestock Judging and Evaluation, The Interstate Printers and Publishers, Inc., Danville, Illinois, 1970
2. Blakely and Bade, Science of Animal Husbandry
3. Bundy, C.E., Diggins, R.V., Christensen, V.W., Swine Production, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1976
4. Ensminger, M.E., Animal Science, The Interstate Printers & Publishers, Inc., Danville, Illinois, 1969
5. Ensminger, M.E., Feeds & Nutrition
6. Ensminger, M.E., Stockmen's Handbook
7. Ensminger, M.E., Swine Science, 4th ed., Danville, Ill., The Interstate Printers and Publishers, 1970
8. Kamstra, Leslie D., Nutrition of Farm Animals, Kendall-Hunt Publishing Company, Debuque, Iowa, 1975

9. Patton, Cassard, and Juergenson, Feeds and Feeding, The Interstate Printers & Publishers, Inc., Danville, Illinois, 1977

10. Stamm, G.W., Veterinary Guide for Farmers, Hawthorn Books, Inc., Publishers, New York, 1963

11. Merck Veterinary Manual, Merck & Co., Inc. Rahway, New Jersey, 1967

12. National Hog Farmer

13. N.Y. Pork Industry Handbook - IMS Cornell

14. Swine Management Handbook - Pennsylvania State

MEDIA:

1. VED Filmstrip - Cal Poly

2. VED Slide sets for judging

ANIMAL SCIENCE CURRICULUM

UNIT: Veterinary Science

LENGTH: As the situation dictates

WHEN TAUGHT: Grades 11 or 12

OBJECTIVES: The student will be able to:

1. be acquainted with opportunities in the animal medical profession.
2. demonstrate proficiency in various office procedures associated with a veterinary practice.
3. demonstrate knowledge of the kennel management.
4. demonstrate skills in following area:
    - A. restraint of animals
    - B. hygiene of dogs & cats
    - C. x-ray procedure
    - D. preparing and staining slides
    - E. fecal exams
    - F. blood work
    - G. urinalysis
    - H. pre and post operative procedure
    - I. identifying of surgical instruments
5. demonstrate basic knowledge of anatomy and physiology.
6. understand the principles of disease and it's control.
7. become familiar with types of medication; their uses and care.

CONTENT:

I. Animal Medical Profession

- A. jobs available
    1. veterinarian
    2. veterinarian assistant
    3. lab technician
    4. kennel owner
    5. others
- B. range or size of the industry
    1. in Connecticut
    2. nationwide

II. Office Procedure

- A. telephone courtesy
- B. reception of clients
- C. record keeping

III. Kennel Management

  A. feeding practices
  B. sanitation
  C. handling & restraint
  D. record keeping
  E. bathing, dipping, and grooming

IV. Lab Techniques

  A. fecal examination
  B. blood work
  C. urinalysis
  D. preparing and staining slides
  E. pre and post operative procedure
  F. identification of surgical instruments

V. Anatomy and Physiology

  A. skeletal
  B. muscular
  C. digestive
  D. neurological
  E. lymphatic

VI. Health and Disease

  A. normal health
  B. diseases
  C. control
  D. medication

    1. uses
    2. care

TEACHER ACTIVITIES:

1. Lecture

2. Demonstration

3. Handouts, slides, films, overheads

4. Speakers

5. Doing activities

6. Field trips

7. Care of animals at school

8. Work experience

STUDENT ACTIVITIES:

1. Maintain notebook
2. Participate in lab experiences and field trips
3. Work with animals

EVALUATION:

1. Review notebooks
2. Quizes or tests
3. Student demonstrate lab techniques
4. Evaluating work experience

RESOURCES:

1. Veterinarians
2. Kennel operations
3. Extension office

BIBLIOGRAPHY:

1. Bailey, J.W. Veterinary Handbook for Cattlemen, Springer Publishing Co.
2. Catcott, Earl J. Animal Hospital Technology, America Veterinary Publication, Inc. Wheaton, Illinois 1971
3. Dykstra R.R. Animal Sanitation and Disease Control, Interstate Publications, Danville, Illinois 1955
4. Leahy, John R. Restraint of Animals, Cornell Campus Store, Inc. Ithaca, N.Y. 1953
5. Scheid, Dan W., Livestock Veterinary Health Service, Highsmith Co., Inc. Fort Atkinson, Wisconsin 1976 53538
6. Siegmund, O.H., The Merck Veterinary Manual, Merck & Co., Inc. Rahway, N.J. 1973
7. Animal Diseases, 1956 United States Department of Agriculture, Yearbook of Agriculture, U.S. Government Printing Office, Washington D.C.
8. Animal Disease, 4H Veterinary Science Program, Cooperative Extension Pub. 1971

9. Herd Health Guide, W.D. Hoard & Sons Co. Fort Atkinson, Wisconsin 1976

10. Horse Science, 4H Horse Program Cooperative Extension Pub., 1971

11. The Normal Animal, 4H Veterinary Science Program, Cooperative Extension Pub. 1971

12. TV Vet Book for Pig Farmers How to Recognize and Treat Common Pig Ailments, Farming Press LTD, Featon House Wharfedale Road, Ipswich Suffolk England 1973

13. TV Vet Book for Stock Farmers #2 Calving the Cow and Care of the Calf, Farming Press LTD, Fenton House Wharfedale Road, Ipswich Suffolk England, 1972

14. TV Vet Horse Book, Recognition and Treatment of Common Horse and Pony

15. Ailments, Farming Press LTD, Fenton House Wharfedale Road, Ipswich Suffold England 1976

MEDIA:

1. Phone Company films on telephone courtesy.
2. ______________________________
3. ______________________________
4. ______________________________

NATURAL RESOURCES CURRICULUM

UNIT: Chainsaw Operation and Maintenance

LENGTH: 6 Weeks

WHEN TAUGHT: Grade 11 or 12, late Fall or early Spring.

OBJECTIVES: The student will be able to:

1. identify and explain the basic functions of the major parts of a chain saw and explain the operating principles with accuracy required to properly operate and care for the saw.
2. select the appropriate chain saw to use for a job considering the saw capabilities and the working conditions such as bucking, limbing or felling.
3. use the proper procedures for preparing to start and starting a chain saw, including refueling, to prevent starting troubles and accidents.
4. operate, adjust engine load and working parts and stop a chain saw using procedures which promote optimum engine efficiency and operator safety.
5. properly clean a chain saw to prevent overheating, promote engine efficiency and prevent excessive wear due to dirt entering the engine.
6. prepare a chain saw for storage of three or more months' duration to prevent corrosion and damage.
7. when using operator's manuals, common chain saws and necessary tools, identify the different types of carburetor air cleaners commonly found on chain saw engines and clean and service them according to the manufacturer's specifications.
8. When given a chain saw with a maladjusted carburetor, adjust the idle speed and high speed carburetor adjustments for maximum engine efficiency when cutting.
9. when given carbon-fouled or worn spark plugs from chain saws, service the old plug or select a new one to replace it according to manufacturer's specifications.
10. sharpen saw chains of th type common to the area with accuracy required to make straight, efficient cuts.
11. remove broken links or damaged saw chain parts and replace them using a punch, hammer and file according to manufacturer's specifications.
12. select, lubricate, adjust and break in a new saw chain according to manufacturer's specifications.

13. troubleshoot problems concerning the saw chain, guide bar and/or sprocket and make needed replacement or repairs on chain saws with worn or malfunctioning parts according to manufacturer's specifications.

14. replace and/or repair a broken starter rope according to instructions in the operator's manual.

CONTENT:

I. Identifying operating principles of two stroke cycle engines

- A. identifying parts
- B. identifying carburetion principles
- C. identifying functions of the compression stroke
- D. identifying functions of the power stroke

II. Identifying major parts of a chain saw

- A. engine parts
- B. chain and bar parts

III. Selecting the chain saw

- A. determining saw capabilities
- B. identifying working conditions

IV. Refueling the chain saw

- A. selecting the fuel
- B. mixing the oil-gasoline mixture
- C. filling the tank using safety precautions

V. Starting the chain saw

- A. performing required servicing
- B. identifying safety precautions
- C. operating starting mechanisms

VI. Operating the chain saw

- A. identifying safety precautions
- B. maintaining proper speed
- C. selection proper load
- D. developing techniques for sawing in different positions
- E. preventing pinching
- F. making minor adjustments
    1. adjusting chain tension
    2. making carburetor adjustments

VII. Cleaning the chain saw

- A. cleaning the outside of the engine, clutch and bar
- B. cleaning the muffler and spark arrester

- C. cleaning the cooling system
- D. cleaning and servicing the air cleaner
- E. identifying broken or excessively worn parts

VIII. Storing the chain saw

- A. preventing corrosion and moisture build-up
- B. preventing gum deposits
- C. preventing dust build-up and physical damage

IX. Servicing chain saw carburetor air cleaners

- A. identifying the type of air cleaner
- B. cleaning the air cleaner element
- C. replacing air filters

X. Adjusting the chain saw carburetor

- A. adjusting the high speed screw
- B. adjusting the idle speed screw
- C. adjusting the choke

XI. Servicing chain saw spark plugs

- A. cleaning the spark plugs
- B. resetting the gap
- C. selecting a replacement spark plug

XII. Sharpening saw chains

- A. identifying chain parts
    1. joint
    2. gullet
    3. side cutting edge
    4. top cutting edge
    5. pitch
- B. identifying the common types of saw chains
    1. chipper-type
    2. chisel tooth chain
    3. other
- C. selecting appropriate equipment
    1. scrench
    2. round file of proper size and file guide
    3. flat file
- D. maintaining correct angles, depthes and distances

XIII. Repairing broken and/or worn saw chain parts

- A. removing parts to be replaced
- B. installing new parts
- C. adjusting new parts

XIV. Replacing saw chains

- A. selecting the new chain
  - 1. identifying sawing conditions
  - 2. identifying saw model and bar size
- B. lubrication new chains
- C. adjusting new chains

XV. Troubleshooting saw chain problems

- A. identifying and repairing cutter problems
  - 1. damaged cutters
  - 2. incorrectly filed cutters
- B. identifying and repairing drive link problems
  - 1. replacing damaged drive links
  - 2. replacing sprockets
  - 3. aligning sprocket and bar groove
  - 4. adjusting chain tension
- C. identifying and remedying tight joints
  - 1. repairing or replacing guide bar
  - 2. installing new sprockets
- D. identifying and remedying causes of crooked cutting
  - 1. checking cutters
  - 2. repairing or replacing guide bars

XVI. Troubleshooting guide bar problems

- A. indentifying and repairing solid nose bar problems
  - 1. repairing splits
  - 2. reshaping the bar
  - 3. replacing the bar
- B. identifying and repairing roller nose bar problems
  - 1. lubricating the roller nose
  - 2. maintaining side plates
  - 3. replacing the roller

XVII. Identifying sprocket problems

- A. identifying causes of sprocket problems
- B. replacing worn sprockets

XVIII. Replacing the starter rope

  A. disassembling the unit
  B. installing the new rope

TEACHER ACTIVITIES:

1. Arrange a trip to a local chain saw dealer to view their sales and service operation. Have the owner sho students the different brands and models available and the equipment used for chain saw maintenance.

2. Demonstrate all available safety gear and require its use.

3. Arrange for a guest speaker on the topic of the importance of safety in the forest industry.

4. Arrange for a trip to a logging operation to view chain saw operation and safety in the industry.

5. Demonstrate proper felling limbing and bucking techniques.

STUDENT ACTIVITIES:

1. Use a cut-away model of a two stroke cycle engine to observe operating principles and to learn the parts and their functions.

2. Practice adjusting chain saw tension and carburetor high speed and idle speed adjustments.

3. Practice cleaning the air filter, cooling system, clutch, bar and muffler after operating the chain saw.

4. Clean and set a spark plug according to the operator's manual using a spark plug feeler gauge.

5. Practice sharpening saw chains using proper tools and techniques. Check the performance of the chain after sharpening.

6. Practice making needed repairs to saw chains such as replacing links using operator's manual as guide.

7. Given saw model and sawing conditions, determine the replacement chain that would be most appropriate to use.

8. Replace a broken or frayed rope on a chain saw engine.

EVALUATION:

1. Rate the students on their identification and explanation of the operating principles of the different parts of a chain saw and its two stroke cycle engine.

2. Evaluate the safe starting, operating and stopping of a chain saw under field conditions.

3. Evaluate student's performance on minor operating adjustments on a chain saw.

4. Give each student a fouled or worn spark plug for him to service or replace. Evaluate the student as to how well he services the plug and sets the gap or if he selects the correct plug to replace the old one.

5. Give each student a worn saw chain to sharpen. Evaluate the student's performance with the necessary depth and angle gauges and by evaluating the performance of the saw as a cut is made.

6. Evaluate the correctness of procedure when replacing a drive link in a saw chain.

7. Evaluate students' performance on all procedures outlined in behavorial objectives.

RESOURCES:

1. Chain saws.
2. Common small engine hand tools.
3. Spark plug feeler gauge.
4. Examples of spark plugs.
5. Ignition file.
6. Saw chains and guide bars in disrepair.
7. Saw chain sharpening tools - files, vises, guides and gauges.
8. Cut-away model of a two stroke cycle engine.
9. Air compressor
10. "Degreaser" solvents".
11. Small engine and chain saw hand tools.
12. Chain saw service manuals and operating manuals.

BIBLIOGRAPHY:

1. Chain Saw Service Manual, Intertic Publishing Corp., Technical Publications Div., Kansas City, MO., 1970.

2. Chain Saw Technicians Workbook, Ken Cook Publications.

3. Forestry Techniques Series, Husgvarna Chain Saw Co.

4. Sarna, R.P., Chain Saw Maintenance.

5. Saw Chain Maintenance Manual, Oregon Saw Chain Co.

6. Small Engines, Volume I, American Association for Vocational Instructional Materials, Engineering Center, Athens, Georgia, 1968.

MEDIA:

1. Chain saw safety (slides) Hobar Publications.
2. Chain saw maintenance (slides) Hobar Publications.
3. Forest 70 (movie) Jonsered Chain Saw Co.

NATURAL RESOURCES CURRICULUM

UNIT: Christmas Tree Production

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, anytime.

OBJECTIVES: The student will be able to:

1. evaluate the market potential and economics of Christmas tree production in his/her area.
2. select appropriate sites for Christmas tree production considering soil requirements, topography and preparation reqirements.
3. lay out a Christmas tree plantation in a manner which will facilitate management.
4. identify the different species of Christmas trees in his/her region and indicate their characteristics and market potential.
5. using needed site preparation and planting tools and equipment, prepare a site and plant Christmas tree seedlings with an acceptable survival rate for his/her area.
6. develop and implement a cultural plan for a Christmas tree plantation which will result in vigorous, well-formed trees.
7. develop and implement a protection plan for a Christmas tree plantation to include fire protection, protection from insects and diseases and protection from animals.
8. develop and implement a harvesting plan for a Christmas tree plantation including timing, equipment and storage.
9. develop and implement a marketing plan for a Christmas tree enterprise including developing outlets, making sales contracts and grading.

CONTENT:

I. Evaluating the market potential and economics

    A. locating markets
    B. developing a budget

        1. estimating costs
        2. estimating returns
        3. determining gross and net returns
        4. determining potential incom/acre/year

II. Selecting sites for Christmas tree production

    A. determining soil requirements
    B. determining acceptable topography

C. identifying drainage requirements

III. Laying out the plantation

- A. developing accessibility by making roads and lanes
- B. determining row and tree spacing
- C. selecting the direction of rows
- D. preventing tree border shading

IV. Selecting tree species

- A. determining characteristics of desirable trees
- B. determining market preferences
- C. identifying Christmas trees

V. Propagation

- A. seed sources
- B. seed collection
- C. seed storage
- D. seedbed construction and preparation
- E. see germination
- F. seedling care

VI. Planting trees

- A. providing needed site preparation
    1. using heavy equipment
    2. using hand tools
    3. using chemicals
- B. obtaining and selecting planting stock
- C. caring for planting stock
- D. planting methods
    1. using hand methods
    2. using planting machines

VII. Implementing a cultural plan for Christmas trees

- A. controlling competing vegetation
    1. operating tools and equipment
    2. maintaining tools and equipment
    3. selecting chemicals
    4. formulating chemicals
    5. applying chemicals
    6. using domestic animals
    7. timing control methods
- B. determining cultural needs
    1. shearing trees
        a. timing

- b. shearing techniques
- c. operating shearing tools
- d. maintaining shearing tools
- e. debudding trees

2. using colorant sprays

    - a. selecting sprays
    - b. timing applications

VIII. Protecting the tree plantation

- A. developing fire protection and fire suppression procedures

    1. selecting suppression equipment
    2. safely operating suppression equipment
    3. maintaining suppression equipment

- B. developing the insect prevention and control program

    1. identifying insect pests and their damage
    2. using mechanical control methods
    3. using chemical control methods

        - a. selecting chemicals
        - b. formulating chemicals
        - c. applying chemicals

- C. developing the disease prevention and control program

    1. identifying disease symptoms
    2. using mechanical control methods
    3. using chemical control methods

- D. controlling damage from domestic and wild animals

IX. Harvesting

- A. timing
- B. selecting equipment
- C. operating equipment
- D. maintaining equipment
- E. organizing the crew
- F. tying or baling trees

X. Marketing Christmas trees

- A. selecting outlets
- B. grading and labeling trees
- C. marketing techniques
- D. record keeping of income and expenses

TEACHER ACTIVITIES:

1. Plan a field trip to local Christmas tree growers to view management techniques.

2. Plan a field trip to State Experiment Station to view research with Christmas tree production, i.e. wee control.

3. Demonstrate proper Christmas tree production, techniques, i.e. planting, shearing and insect control.

4. Provide for conifer identification practice.

5. Make a long term agreement to use a parcel of land for a Christmas tree plantation.

STUDENT ACTIVITIES:

1. Develop a budget for a Christmas tree enterprise on a designated site after obtaining cost/return data from successful enterprises.

2. Take field trips to potential plantation sites and evaluate them.

3. Have successful Christmas tree enterprise operators as resource persons to discuss methods of laying out a plantation to facilitate management.

4. For a given site, develop a plantation layout considering accessibility, spacing, row direction and shading.

5. Take field trips for conifer identification.

6. Visit a nursery to observe planting stock production and seedling characteristics.

7. Select a site, plant and manage a small number of Christmas trees for personal use.

8. Select chemicals and determine formulations for a given insect or disease problem and situation.

9. Develop an exhibit or bulletin board display of specimens or pictures of important Christmas tree damaging insects.

10. Take a field trip to a Christmas tree plantation and have the owner or an employee indicate examples of each grade of tree.

EVALUATION:

1. Have each student make a budget for a Christmas tree enterprise on a given site.

2. Have each student determine the feasibility of designated site for a Christmas tree plantation by determining soil characteristics, topography and any other pertinent data.

3. Have each student lay out a Christmas tree plantation on a designated site. The plans should consider all pertinent factors about the site and promote ease of management.

4. Develop a practical examination using branches, pictures or live specimens in which the student must identify the different species of Christmas trees important to his/her area.

5. Have each student plant 100 Christmas trees. Evaluate each student on his abiltiy to correctly plant the trees.

6. Have each student shear a Christmas tree for evaluation as to correctness of procedure and observance of safety practices.

7. Have the students identify specimens of Christmas tree insects, indicate the damage caused to trees, and recommend an appropiate control program for each.

8. Evaluate each student's demonstration on their abiltiy to cut, trim and bale a Christmas tree.

9. Develop a practical examination in which the student will grade 10-15 Christmas trees using U.S. standard Christmas tree grades.

RESOURCES:

1. Local Cooperative Extension Service office for Christmas tree production publications.

2. Christmas Tree Producers Handbook, Massachusetts Cooperative Extension Service.

3. Christmas tree seed and seedling companies for copies of their catalogues and price lists.

4. List of materials:

    hard hats
    shearing knives and leg protectors
    chemical sprayers
    fire fighting equipment
    axe
    bow saw
    tree planting bars
    buckets
    land level

BIBLIOGRAPHY:

1. Chapman, A.G. and Wray, R.D., Christmas Trees for Pleasure and Profit, Rutgers University Press New Brunswick, N.J., 2nd edition, 1979

2. Harlow, William, Trees of the Eastern and Central United States and Canada, Dover Publications, New York, 1957

3. Wyman, E.P., and Miller, R., Growing Christmas Trees in Connecticut, Cooperative Extension Service, College of Agriculture and Natural Resources, The University of Connecticut, Storrs, 06268, 1972

4. United States Department of Agriculture, Code of Federal Regulations #7, Agriculture

MEDIA:

1. Coniferous Trees, 65 Frames, IL $5.20

NATURAL RESOURCES CURRICULUM

UNIT: Fish Culture

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, Spring.

OBJECTIVES: The student will be able to:

1. identify fish species tht are propagated in hatcheries.
2. list habits of major fish species.
3. identify laws pertaining to fish.
4. prepare a food purchase to cover fish hatchery needs.
5. determine the chemical properties of water necessary for fish production.
6. plan a food purchase to cover fish hatchery needs.
7. draw a preliminary design of a fish hatchery to take into consideration basic criteria for its development.
8. identify important fish food found in waterways.
9. tie a fly to match natural trout food.
10. tie common knots for line attachment.
11. cast with a flyrod.

CONTENT:

I. Identify fish produced in hatcheries

   A. determining recognition characteristics
   B. identifying hatchery fish

II. Fish habits

   A. preferred habitat
   B. growth rates
   C. breeding habits
   D. feeding habits

III. Fish laws

   A. equipment useage
   B. legal lengths
   C. seasons
   D. limits

IV. Hatchery design

   A. water source and quality

B. pool design
C. quantity of fish in pools
D. installation of plumbing
E. hatch house

V. Food

A. nutrition considerations
B. quantity of food needed
C. feeding program

VI. Chemical properties of water

A. using test kit to determine chemical properties and levels

VII. Eggs

A. source of eggs
B. measuring of eggs
C. handling of eggs

VIII. Natural foods

A. terrestrial foods
B. natural foods

IX. Fly tying

A. limitation of natural foods
B. knots
    1. fly attachment
    2. splices

X. Fly rodding

A. types of fly rods
B. types of fly lines
C. use of fly rods

TEACHER ACTIVITIES:

1. Arrange to have a conservation officer visit to explain laws relating to freshwater fish.

2. Arrange a field trip to a fish hatchery.

3. Demonstrate fly tying and fly rod techniques.

STUDENT ACTIVITIES:

1. Identify fish species commonly found in fish hatcheries.

2. Visit a fish hatchery to observe employees in operation of their duties. Interview manager of the hatchery.
3. After a visit to the hatchery, design a fish hatchery. Each item of the drawing will be labeled with dimensions and fish capacity. A feeding program for each section of the hatchery will be completed.
4. Visit three different streams to measure the chemical properties and relate the values of each to fish production.
5. Tie at least two artificial flies to imitate natural trout food.
6. Practice with fly rod and use their tied flies in actual pursuit of trout.

EVALUATION:

1. Using slides, have students identify important commercial fish species.
2. Have student collect and identify important stream fish food.
3. Evaluate student's results of chemical and physical analysis of stream.
4. Have student draw a fish hatchery and fill out an information sheet concerning number of fish in pools, size of fish, feeding of fish and efficiency factors.

RESOURCES:

1. Have a district fish histologist explain fish stocking procedures and stream evaluation in area.
2. Use Hach chemical test kits to determine water quality.
3. State fish hatchery.
4. Use of local streams.
5. Conservation officer.
6. Fly tying materials.

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1. Greenberg, David, Trout Farming, Chilton Co.
2. Lagler, Karl, Freshwater Fishery Biology, Brown Co.
3. Lee, G.S., Commercial Catfish Farming, Interstate Printers and Publishers, Inc.

MEDIA:

1. ____________________

2. ____________________

NATURAL RESOURCES CURRICULUM

UNIT: Forest Fires: Prevention and Control

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, early Spring or early Fall.

OBJECTIVES: The student will be able to:

1. demonstrate an understanding of fire and its causes.
2. describe the effects of forest fires on plant and animal life, property and soil and water quality.
3. demonstrate the abilities necessary in fire control as well as care and use of equipment.
4. describe means of preventing forest fires.

CONTENT:

I. Forest fires

    A. fire as a natural phenomenon

        1. history of forest fires and their effect on our present forests
        2. fire triangle
        3. factors influencing forest fires

            a. types and condition of fuels
            b. weather - climate and fire seasons
            c. topography

        4. types of forest fires

            a. surface fires
            b. ground fires
            c. crown fires

        5. forest fire behavior

            a. burn patterns
            b. relationships to environmental factors

    B. effects of forest fires

        1. effects on trees

            a. species resistance
            b. lethal temperatures
            c. tree injuries - scars, defoliation
            d. disease and insect damage susceptability

        2. related effects

a. soils
b. related vegetative cover
c. wildlife and wildlife habitat
d. general forest ecology
e. beneficial effects

II. Forest fire prevention

A. causes of forest fires

1. children
2. incendiary
3. smokers
4. forest recreation
5. equipment use
6. debris burning
7. lighting

B. fire prevention

1. recognizing and dealing with fire hazards

a. fuel removal
b. firebreaks
c. prescribed burns to reduce flash fuels

2. education

a. state and federal forest service
b. local fire departments
c. Smokey Bear
d. civic groups
e. media

3. regulation of public use of wild lands
4. law enforcement

III. Controlling forest fires

A. fire detection and reporting
B. crew organization
C. types of equipment, use and care

1. backpack pump
2. fire rake
3. broom rake
4. axe
5. brush hook
6. mattock
7. hoe
8. shovel

D. methods of forest fire attack

1. parts of a fire
2. direct attack
3. indirect attack

E. setting up a fire line

TEACHER ACTIVITIES:

1. Arrange to have State Forestry personnel train students in fire control methods.
2. Arrange for a class fire prevention project in the local area, i.e. permanent fire break, forest fire fighting team and educational presentation.
3. Ask local fire department to come to class and exhibit fire fighting equipment.
4. Plan a trip to a local fire lookout tower/fire fighting station and discuss career responsibilities and opportunities with employees.
5. Encourage and demand good fire prevention havits, i.e. smoking, chain saw operation and campfire management.
6. Have students monitor daily fire hazard conditions and publicize.

STUDENT ACTIVITIES:

1. Practice fire line construction following training sessions.
2. Prepare fire prevention activities, posters, etc.
3. Obtain Smokey the Bear outfit and other fire prevention materials from State D.E.P. for use at local open house.
4. Determine fire size and rate of spread in simulated problems and determine where and how to locate fire lines.

RESOURCES:

1. State fire warden or forestry personnel for training of student fire crew.
2. Local fire departments.

BIBLIOGRAPHY:

1. Brown, Arthur A., Davis, Kenneth P., Forest Fire: Conrol and Use, 2nd edition., McGraw-Hill Book Co., New York, 1973.
2. Forbes, R.D., Forestry Handbook, The Ronald Press, New York, 1955.
3. Manual for Forest Fire Fighters, Northeast Area, U.S. Forest Service.
4. Stoddard, Charles H., Essentials of Forestry Practice, 2nd ed., The Ronald Press, New York, 1968.

5. Water vs. Fire, Fighting Forest Fires with Water, Northeast Area, U.S. Forest Service, Revised 1973.
6. 1975 Wildfire Statistics, October 1976, Northeast Area, U.S. Forest Service.

MEDIA:

1. Films concerning fire fighting practices, used by State personnel during training season.
2. Transparency masters available from various instructional supply services depicting fire damage and statistics.

NATURAL RESOURCES CURRICULUM

UNIT: Forest Harvesting Practices

LENGTH: 6 Weeks

WHEN TAUGHT: Grade 11 or 12, Fall or Winter.

OBJECTIVES: The student will be able to:

1. learn how timber is purchased and sold in the Connecticut area.
2. maintain tools involved in harvesting practices.
3. operate harvesting tools.
4. safely and efficiently fell, limb and buck trees for maximum product value.
5. write timber sales agreements.
6. measure gross and net volume contents of logs.
7. plan logging roads, trails and log landings to conserve soil, water and wildlife resources.

CONTENT:

I. Connecticut forest products and occupational opportunity
    A. forest type, history and land area
    B. roundwood products
    C. structural limber products
    D. by-products
    E. sawmill location and types
    F. job descriptions in Connecticut harvesting industry

II. Business management practises for harvesting
    A. timber sales agreements
    B. buying and selling techniques
        1. site bidding
        2. grading timber for buying or selling
        3. log rule selection
        4. writing timber sales contract
    C. harvest plan
        1. road access
        2. timber distribution, topography
        3. legal limitations
        4. division of labor method

III. Harvesting systems

- A. shelterwood harvest cuttings
- B. selection harvest cuttings
- C. rotation harvest cuttings
- D. diameter limit harvest cuttings
- E. disadvantages and advantages of cutting types in given situations

IV. Chain saw maintenance and operation

- A. chain saw parts

    1. variations
    2. advantages and disadvantages of part variations (cutter tooth types, clutches, bar types, etc.)

- B. chain and bar maintenance

    1. tension adjustment
    2. guide bar problems, position, and corrective maintenance
    3. chain problems and corrective maintenance
    4. routine daily maintenance

- C. lubrication system maintenance and problems
- D. ignition system

    1. variations
    2. problems
    3. field troubleshooting and corrective maintenance

- E. fuel system

    1. method of operation
    2. adjustments
    3. field troubleshooting

- F. chain saw storage procedures
- G. starting and operating procedures

    1. hand, foot and body position during starting procedure
    2. safety equipment
    3. body position during operation of the saw
    4. cutting techniques

V. Timber felling practises

- A. safety equipment usage
- B. felling tool usage

    1. axes
    2. wedges: plastic, magnesium, wood
    3. field adjustment and sharpening tools
    4. cant hook

C. standing tree problems

  1. head and side lean
  2. butt or top rot
  3. wind velocity and direction
  4. surrounding obstacles

D. clearing felling area

  1. brush
  2. potential snapper poles
  3. other hazardous conditions

E. felling techniques

  1. for sound straight trees
  2. for heavily leaning trees
  3. for trees with butt rot
  4. for trees with top rot
  5. for altering direction of fall away from lean
  6. for "hung" trees
  7. for trees with "setback"
  8. for double stems requiring a "boring backcut"
  9. communication with "wedgeman"

F. limbing techniques

  1. safety precautions

    a. tensioned and compressed limb areas
    b. "snapper" poles
    c. use of hands to remove limbs
    d. top lopping

G. bucking techniques

  1. use of the wedge
  2. safety precautions
  3. bucking for top bind
  4. bucking for bottom bind
  5. bucking for end bind
  6. bucking for grade

VI. Log scaling practises

A. defintion of the scaling cylinder
B. natural and man-made defects
C. measurement standards for wood practises

  1. trim allowance variation
  2. length measurement
  3. diameter measurement

D. diameter tape use, log scale stick use, log rule selection

  1. international ¼ inch

    2. Doyle
    3. Scribner

E. defect deduction methods

    1. for butt rot
    2. for fire scar
    3. for crook
    4. for sweep
    5. for ring shake

F. scaling records

VII. Related topics

A. logging road layout and construction
B. methods of marketing the product
C. sawmill operation
D. log and lumber grading

TEACHER ACTIVITIES:

1. Lecture time will be utilized to introduce students to forest products and occupational opportunity.

2. Demonstration of writing timber sales contracts, utilizing log scale sticks, interpreting log rules and log defects shall be presented.

3. Chain saw parts should be provided for student observation.

4. Field labs to provide felling experience, exposure to various logging jobs in progress, and sawmill activities should be organized.

5. Demonstrate felling, limbing and bucking techniques.

6. Demonstrate chain saw maintenance and operation.

STUDENT ACTIVITIES:

1. Retain notes of lecture and reading activities.

2. Answer questions provided in work manuals as well as abstract information from magazine articles related to production activities.

3. Perform all routine maintenance tasks related to chain saws.

4. Determine board foot content in standing trees and logs, using required tools and accepted rules.

5. Perform and repeat skills in chain saw operation, felling, limbing and bucking.

6. Write timber sales agreements.

7. Discuss and compare differences, similarities, advantages and disadvantages with respect to various harvesting systems.

EVALUATION:

1. Quizzes, tests and question review from manuals.

2. Observe students performance in chain saw maintenance. Check for correct use of tools and proper adjustment of saws.

3. Evaluate procedures of felling, limbing and bucking from the standpoint of safety and efficiency.

4. Evaluate accuracy for log measurements for volume.

5. Check students for correctness of proportions and angles (gas/oil ratio, saw chain angles, etc.)

RESOURCES:

1. Regional foresters (private or State).

2. Local wood producers

   A. loggers
   B. sawmill operators

3. Chain saw dealers and repair shops.

4. Materials and equipment:

   A. log scale sticks
   B. hard hats
   C. timber chaps
   D. toe guards
   E. ear protection
   F. chain saws (minimum of 14" bar length suggested)
   G. magnesium and plastic wedges
   H. diameter tape
   I. eye protection
   J. single bit axes
   K. Oregon "file 'n' joint" unit
   L. saw wrenches, files
   M. safety gas cans
   N. bar oil containers
   O. work gloves
   P. chain and bar samples, sprocket samples
   Q. bar oil, regular gas, correct two cycle oil blend

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1. Bromley, W., Pulpwood Production, Interstate Printers, Danville, IL.

2. Brown, W.H., An Introduction to the Seasoning of Timber, Pergamon Press, NY.

3. Dent, D. Douglas, *Professional Timber Felling: A Procedural Approach*, Ryder Printing Co., Portland Oregon.

4. Desch, *Timber: Its Structure and Properties*, MacMillan Co, NY.

5. Dilworth, J.R., *Log Scaling and Timber Cruising*, Oregon State University Press.

6. Forbes, R.D., *Forestry Handbook*, Ronald Press, NY.

7. Ludstrum, S., *Circular Sawmills*, United States Department of Agriculture.

8. *Oregon Saw Chain Manual*, Courtesy of Omark Industries

9. *Products From Our Forests, Their Manufacture and Use*, Penn. State University, Department of Agricultural Education.

10. *Chain Saw Technician Workbook*, Automated Teaching Systems by Ken Cook Transnational, Milwaukee, Wisconsin.

MEDIA:

1. Transparency masters for production forestry available from Vocational Instructional Services, Agricultural Education, Texas A & M University, College Station, Texas.

2. Safety films re: chain saw operation and skidder/logging safety from Caterpillar Tractor and Homelike through Modern Talking Picture Service.

3. Slide set on hardwood log and lumber grading form Instructional Materials Services: Cornell University, Ithaca, NY.

NATURAL RESOURCES CURRICULUM

UNIT: Forest Measurements

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, Fall, Winter or Spring.

OBJECTIVES: The student will be able to:

1. identify and explain the type or types of legal surveys used in his state or region with accuracy specified by the instructor.
2. obtain distance on level ground (less than 2% slope) by pacing with less than 2% variation in 100 feet and by chaining with a steel tape and chaining pins with an allowable error of .02%.
3. obtain distance on sloping ground (over 2%) by pacing with less than 4% variation and by breaking chain using a steel tape and chaining pins with an allowable error of one foot in 500 feet.
4. establish predetermined angles or bearings using a surveyor's staff compass to within one degree.
5. run an open traverse and a closed travers in the field using a staff compass, steel tape and chaining pins with the closed traverse to close within one foot in 500 feet of distance.
6. determine the land area, within one acre per twenty acres, of area having triangular, rectangular, trapezoidal, trapezium or curved boundaries using land measurements and set formulas.
7. use one or more of the following mearsures of forest products to determine the volume of wood in a specified number of logs or bolts with accuracy required of a forestry aide: linear measurement, cordwood measurement, cubic foot measurement, board foot measurement, and weight.
8. using common tree measurement instruments and tree volume tables, determine the volume of timber in a standing tree within +/- 3%.
9. using tree identification keys and an increment borer or increment hammer, determine the species, age and/or history of a standing tree with accuracy required of a forestry aide.
10. when given commonly used surveying instruments, locate and establish forest boundaries and sample plots with the accuracy needed to perform a timber cruise.
11. identify and implement the different methods of cruising timber with competency required of a forest aide.
12. using state or regional price date, estimate the value of a given stand of timber within +/- 10%.

13. using a sprayer or brush and bucket, mark trees for harvesting using marking techniques accepted in the state or region.

CONTENT:

I. Identifying types of public land surveys

   A. using the metes and bounds system
   B. using the rectangular system
   C. interpreting deeds and legal descriptions

II. Making linear measurements on level ground

   A. pacing
   B. chaining

      1. identifying units of measure
      2. identifying the equipment and its proper use
      3. caring for the equipment
      4. recording field notes

III. Making linear measurements on sloping ground

   A. pacing
   B. breaking chain

IV. Establishing angles and bearings with a staff compass

   A. transporting the instrument safely
   B. setting up the instrument
   C. reading the compass
   D. allowing for angle of declination

V. Running open and closed traverses

   A. establishing angles
   B. chaining

VI. Determining acreage in land areas

   A. measuring boundaries
   B. making calculations

VII. Measuring forest products

   A. using board feet

      1. determining circumstances of use
      2. using formulas to calculate board feet

   B. using cubic feet

      1. determining circumstances of use
      2. calculating cubic feet

- C. using the cord
    - 1. identifying different types of cord measurement
        - a. standard
        - b. long
        - c. short
    - 2. determining circumstance of use
    - 3. calculating cords
- D. using unit or piece measure
- E. using weight measure

VIII. Determining the volume of timber in a standing tree

- A. determining the diameter breast height (DBH)
- B. determining the height and number of logs in the tree
- C. observing tree defects or damage
- D. using tree volume tables
    - 1. international
    - 2. Doyle
    - 3. Scribner
    - 4. other

IX. Determining the species, history and/or age of a tree

- A. identifying tree species
- B. interpreting annual rings
- C. using the increment borer or hammer

X. Determining the "Site Quality Index" of a given site

- A. determining species
- B. determining height of a tree
- C. determining D.G.H. and obtaining increment borer sample
- D. interpreting site quality index

XI. Establishing forest boundaries and location of sample plots

- A. identifying characteristics of metes and bounds and rectangular survey systems
- B. operating forest surveying equipment
    - 1. staff compass
    - 2. chain and chaining pins
    - 3. Abney hand level
- C. interpreting maps and aerial photographs

XII. Cruising timber

- A. implementing the different methods of cruising timber

        1. making a 100% or total cruise
        2. using the random sample method
        3. using mechanical sampling methods

            a. line-plot cruising
            b. strip cruising

        4. using the variable plot method

            a. using a wedge prism
            b. computing the basal area in square feet per acre

    B. making a continuous forest inventory

        1. locating the sample plot
        2. collecting data

XIII. Estimating the timber value of a forest area

    A. reading timber price data
    B. calculating timber value

XIV. Marking trees for harvesting

    A. using correct symbols
    B. selecting trees for marking
    C. operating and maintaining the equipment

TEACHER ACTIVITIES:

1. Arrange to have local service forester speak to students about forest measurements, tree identification and growth.

2. Arrange a field trip to a local forest presently being surveyed and/or cruised. Have students assess if possible.

3. Demonstrate the use of and care of all equipment.

STUDENT ACTIVITIES:

1. Determine the type of legal survey used in their state or region and practice locating specified sites or land areas from deeds or land descriptions. Visit a local town clerk's office.

2. Chain a 100 foot distance on level ground, determine the number of paces needed to pace the distance, and calculate the length of each pace.

3. Chain and pace a specified distance on sloping ground to determine the effects of slope on length of pace.

4. Take a point on a topographic map and select a destination point. Attach strings from the starting point along a true north direction and a magnetic north direction. Calculate the distance by which they would have missed the destination by following the magnetic north without allowing for angle of declination.

5. Have pair of students run closed traversed in the field using the necessary equipment. Have a soil conservation service aide or technician assist in instructing the students if necessary.

6. Practice determining acreages by running closed traverses and calculating the acreage from the results.

7. Given the measurements of standing trees, logs, or boards, calculate the board feet, cubic feet and/or linear feet in the material.

8. Practice determining the volume of wood present, in an assigned number of trees or a plot in a forested area.

9. With the assistance of a service forester or a forest industry representative, identify tree species, using the increment borer and interpreting cores taken from trees.

10. Take a field trip to a forested area that is being surveyed to establish legal forest boundaries and/or to locate sample plots for cruising. Observe the procedures and assist, if possible.

11. Perform a total cruise on a given forest plot to develop abilities in identifying trees, determining tree volumes and reading volume tables.

12. From the cruise made in learning activity #5, compute the value of the timber using regional price data.

13. Use the service forester as a resource person to demonstrate the proper methods and symbols to use in marking trees for harvesting.

EVALUATION:

1. Have each student write a description of the basic types of legal surveys.

2. Have each student measure distances by pacing ground. Evaluate the students by chaining the same distances with accuracy to be within limits set in the performance objectives.

3. Have each student measure distances by pacing on sloping ground. Evaluation should be in accordance with the limits set in the performance objectives.

4. Have each student establish angles using a transit or staff compass with accuracy to be within one degree of the specified angle.

5. Have pairs of students run a closed traverse using a transit or staff compass, steel tape and chaining pins with accuracy within one foot in 500 feet of distance.

6. Determine the land area in acres of regularly and irregularly shaped land areas by making all necessary measurements needed for calculation and using set formulas.

7. Assign the students 10 to 15 trees to determine the volume, using a cruiser stick and tree valume tables. The student should be accurate within +/- 10%.

8. Have the students interpret the rings from a core taken from a tree with an increment borer. The students should indicate the tree's age and any major historical features that could be observed on the core.

9. Divide the students in pairs. Have each pair of students establish the boundaries of a sample plot in a forested area using the necessary surveying equipment. Evaluate the students on accuracy and correctness of procedure. Obtain aid in evaluation from a service forester, forest industry representative or soil conservation service representative, if necessary.

10. Have the class cruise a forested area using one of the basic methods. Evaluate each student on his correctness of procedure, accuracy, and cooperation. The accuracy of the cruise can be checked if the area has recently been officially cruised.

11. Have each student calculate the total value of a forested area when given the results of a timber cruise and regional price data.

12. Have each student list the different marks or symbols used for marking trees and explain their meanings.

RESOURCES:

1. Staff compass.
2. Steel tape and chaining pins.
3. Hand compass.
4. Field notebook.
5. Deeds or legal land descriptions.
6. Hard hats.
7. Cruiser sticks.
8. Staff compass.
9. Abney level and/or clindmeter.
10. Increment borer and/or hammer.
11. Timber volume tables.
12. Site Quality Index graphs.
13. Regional timper price data.
14. Tree identification keys.

15. Talley sheets.

16. Paint sprayer or bucket and brush.

17. Tree diameter tapes and/or calipers.

18. 10 factor pri.

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2. Avery, T. Eugene, Interpretation of Aerial Photographs, Burgess Publishing Co., Minneapolis, MN., 1968.

3. Bell, J.F. and Dilworth, J.R., Variable Probability Sampling, O.S.U. Book Stores, Inc., Corvallis, Oregon, 1976.

4. Brinker, R.C. and Taylor, W.C., Elementary Surveying, International Textbook, Co., Scranton, PA., 1965.

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7. Forbes, R.D., Forestry Handbook, The Ronald Press Co., New York, NY.

8. Harvesting Forestry Products, Vocational Instructional Services, Texas State Department of Education, Kirbyville, TX., 1971.

9. National Forest Log Scaling Handbook, Forest Service, U.S. Department of Agriculture, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. (stock #0101-00364).

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12. Sipe, F. Henry, Compass Land Surveying, McClain Printing Co., Parsons, West Virginia, 1974.

13. Timber Cruising Workshop (hand-out), Six State Conference, Essex Agricultural & Technical Institute, 1977.

NATURAL RESOURCES CURRICULUM

UNIT: Forest Products

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, anytime.

OBJECTIVES: The student will be able to:

1. list the important timber species of Connecticut and the types of products manufactured from them.
2. describe the basic structure and properties of wood.
3. explain what properties cause differences in value and use of woods.
4. correctly identify wood samples as assigned.
5. describe the basic principles behind log and lumber grading.
6. scale and grade logs.
7. describe career opportunities in the forest products field.

CONTENT:

I. Identifying timber species in Connecticut

II. Identifying wood products

- A. primary wood products
    1. sawlogs
    2. veneer logs
    3. pulpwood
    4. posts and pilings
    5. tie logs and mine timbers
    6. specialty products
        - a. christmas trees
        - b. maple syrup
        - c. witchhazel
- B. secondary wood products
    1. cooperage
    2. pallets
    3. veneer and plywood
    4. furniture
    5. pulp and wood
    6. particleboard and flake board
    7. boxes and crates

III. Properties and structure of wood

- A. characteristics of wood
    - 1. resistance to decay
    - 2. strength
    - 3. versatility
    - 4. workability
    - 5. resiliency
    - 6. resistance to temperature change

- B. structure and functions of wood
    - 1. bark
    - 2. cambium
    - 3. vessels and rays
    - 4. fibers
    - 5. heartwood and sapwood

IV. Identfication of wood samples

V. Log scaling

- A. length
- B. trim allowance
- C. diameter at small end
- D. defects
- E. volume determination

VI. Wood processing

- A. sawmills
    - 1. types of mills
    - 2. circular saws
    - 3. band saws

- B. sawing process
- C. types of cuts and uses
    - 1. end cut
    - 2. radial cut
    - 3. tangential cut

VII. Career opportunities

TEACHER ACTIVITIES:

1. Arrange field trips to different types of sawmill operations.

2. Request log grader to assist students in learning to grade logs.

STUDENT ACTIVITIES:

1. Review tree identification. Collect bark and wood of species to be studied.

2. List types of wood products with which they are familiar.
3. Field trips to see as many different types of mills as is possible and to view product manufacture.
4. Field trip to saw mill to observe and/or assist grader in grading logs.
5. Practical scaling of logs of varying sizes.
6. Field trip to lumber yard to view sales operation.
7. Identify wood samples.
8. Identify wood structure in diagrams and samples.

EVALUATION:

1. Evaluate student's results from scaling and grading exercises.
2. Evaluate student identification of wood samples.
3. Conventional quizzes and tests.

RESOURCES:

1. State of Connecticut: Primary Processors Forest Products Utilization, Department of Environmental Protection.
2. Local sawmills for field trips.
3. Local forestors.
4. Wood samples
5. Log scale sticks.
6. Green lumber rule.

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3. Harlow, William M., Inside Wood: Masterpiece of Nature, The American Forestry Association, 1970.
4. Panshin, A. J., et al, Forest Products Their Sources, Production and Utilization, McGraw-Hill Book Company, New York, 1962.
5. Panshin, A.J. and Carl de Zeeuw, Textbook of Wood Tchnology, Vol. I 3rd Ed., McGraw-Hill Book Company, New York, 1964.

6. Wyman, Edgar P., Growing Christmas Trees in Connecticut, Extension Bulletin #72-20. College of Agriculture and Natural Resources, University of Connecticut, Storrs, Connecticut.

7. Wyman, Edgar P., Planting Forest Trees in Connecticut, Extension Bulletin #72-19, College of Agriculture and Natural Resources, University of Connecticut, Storrs, Connecticut.

8. Various literature is available through the following organiations:

American Wood Council
1619 Massachusetts Ave., NW
Washington, D.C. 20036

American Plywood Association
1119 A Street
Tacoma, Washington 98401

Canadian Wood Council
701-170 Laurier Ave. West
Ottawa, Ontario K1p5V5

Southern Forest Products Assoc.
P.O. Box 52468
New Orleans, Louisiana 70152

Western Wood Products Association
700 Yeon Building
Portland, Oregon 97204

MEDIA:

1. Slide series: Relationship of Hardwood Log and Lumber Grades, IMS, Cornell.

2. Wood Technology, series of transparencies on wood and wood products, DCA Educational Products, Inc., 1969.

3. Maple Syrup Production, filmstrip, available through NASCO.

NATURAL RESOURCES CURRICULUM

UNIT: Forest Protection

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, Fall.

OBJECTIVES: The student will be able to:

1. identify major tree diseases in our forest region.
2. select the most appropriate control measure for a given disease.
3. perform the necessary prevention or control procedures to keep disease losses at a minimum.
4. identify major tree insects in our forest region.
5. select the most appropriate control measure for a given insect.
6. perform the necessary prevention or control procedures with accuracy needed to keep insect losses in the forest at a minimum.

CONTENT:

I. Identifying major forest diseases
    A. identifying rot causing fungi
    B. identifying foliage diseases
    C. identifying stem diseases
    D. identifying root diseases

II. Developing disease prevention and control programs
    A. preventing forest diseases
    B. determining disease control methods

III. Determining the role of insects in the forest
    A. determining importance of forest insects
    B. identifying beneficial insects
    C. identifying destructive insects
        1. conifer and hardwood defoliators
        2. tip, cambium, heartwood and root feeders
        3. sap feeders
        4. identifying disease vectors
    D. identifying forest insects damage

IV. Selecting insect control measures
    A. determining direct control methods
        1. using mechanical methods
        2. using chemical methods

B. determining indirect control methods

  1. using silvicultural practices
  2. using indirect biological and chemical controls

C. determining forest insect control regulations

V. Identifying other destructive agents

  A. determining the effects of forest animals
  B. determining the effects of man
  C. determining the effects of natural phenomena

TEACHER ACTIVITIES:

1. Organize a field trip for observation and collection of samples.

2. "Dissect" a tree with a chain saw to show visible signs of disease and decay.

3. Organize field trips to forests/plantations exhibiting protective measures to prevent damage to trees by insects, diseases, man, animals and/or climatic factors.

STUDENT ACTIVITIES:

1. Make field observations of trees to show visible signs and symptoms of decay.

2. Develop a disease prevention program for a given forested area.

3. Locate, capture and identify forest insect pests.

4. Sketch damage caused to forest trees from insects and diseases.

5. Prepare a report on one major forest insect and disease to be given in class. Each student will be required to fill out a work sheet on each insect and disease.

6. If an insect infested area is available, have students perform mechanical or chemical measures to help control insect damage.

EVALUATION:

1. Rate students' collection and identification of 35 insects or insect damaged parts. The following information is to known: common name, order, identification feature, plants damaged or beneficial results, economic importance, control and type of metamorphosis.

2. Rate presentation of information on important forest insects.

3. Evaluate students' identification of slides of the more common forest diseases.

4. Evaluate plan developed for a given forest area concerning insect and disease control.

RESOURCES:

1. Exterminator in local area.

2. Visit forest experiment statsion to observe their work with insects.

3. Use extension forester to discuss injury of forests from insects and control methods.

BIBLIOGRAPHY:

1. Anderson, Roger, Forest and Shade Tree Enotomology, John Wiley and Son.

2. Borror and White, A Field Guide to the Insects, Houghton Mifflin Co.

3. Diseases of Shade and Ornamental Trees.

4. Graham, S.A., Knight, F.B., Principles of Forest Entomology, McGraw Hill.

MEDIA:

1. Films available from Shell Film Library

    A. "Food or Famine"
    B. "Rural World"

2. Slides depicting signs of insect/disease/animal damage.

NATURAL RESOURCES CURRICULUM

UNIT: Forest Soils

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, early Fall or Spring.

OBJECTIVES: The student will be able to:

1. identify the physical and chemical properties of forest soils.
2. identify factors which promote and destroy forest soils.
3. judge land for proper use and maximum production.

CONTENT:

I. Development of forest soils
    A. classification of parent materials
    B. type of vegetation
    C. humus production

II. Physical properties
    A. soil texture
    B. soil structure
    C. soil porosity
    D. permeability

III. Chemical properties
    A. soil reactions
    B. essential nutrients for forest growth
    C. toxic agents in runoff areas
    D. mineral deficiencies

IV. Organisms of forest soils
    A. bacteria and fungi
    B. insects
    C. earthworms and nematodes

V. Physical damage to forest soils
    A. compaction and erosion
        1. animal
        2. harvesting equipment
    B. forest fires
    C. overgrazing in range lands

VI. Land use management
    A. land judging

        1. drainage classes
        2. depth favorable to roots
        3. fertility
        4. planting difficulties
        5. access limitations

    B. forest lands as watersheds
    C. planting and reforestation techniques
    D. mapping

        1. topography

TEACHER ACTIVITIES:

1. Use lecture periods to explain forest soils and how they influence tree growth.

2. Demonstrate the procedures for judging land use and if possible use dug pits on land lab.

3. Contact local soil conservation services to plan field trips and aid in land use classification.

4. Contact local town personnel in regards to large equipment (backhoe if available to dig soil pits).

5. Prepare laboratory projects on plant deficiencies and effects of germination on compacted forest soils.

STUDENT ACTIVITIES:

1. Maintain a notebook on lectures and discussions.

2. Answer study questions.

3. Take forest soil samples for class labs.

4. Test their forest samples for water holding capacity, chemical deficiencies, and various physical properties.

5. Evaluate test findings.

6. Develop a notebook on land use classification of local forests near school.

EVALUATION:

1. Review notebooks and homework.

2. Evaluate student learning through quizzes and tests.

3. Have students demonstrate laboratory techniques.

4. Evaluate recommendations of students after testing various forest soils.

5. Evaluate notebook on land use classification.

RESOURCES:

1. Contact local extension office and University of Connecticut for publications.
2. Invite local foresters and soil conservation people to give shop talks and help arrange field trips.
3. Lab and soil testing equipment.

BIBLIOGRAPHY:

1. Forbes, Reginald D., *Forestry Handbook*, Ronald Press, 1955.
2. USDA, *Woodlands of the Northeast*, Erosion and Sediment Control Guide.

MEDIA:

1. ____
2. ____

NATURAL RESOURCES CURRICULUM

UNIT: Forest Surveying and Land Measurement

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, Fall or Spring.

OBJECTIVES: The student will be able to:

1. identify and explain the type or types of legal surveys used in this state with accuracy specified by the instructor.
2. obtain distance on level ground (less than 2% slope) by pacing with less than 2% variation in 100 feet and by chaining with a steel tape and chaining pins with an allowable error of .02%.
3. obtain distance on sloping ground (over 2%) by pacing with less than 4% variation and by breaking chain using steel tape and chaining pins with an allowable error of one foot in 500 feet.
4. measure angles with the steel tape.
5. establish predetermined angles or bearings using a transit or a surveyor's compass to within one degree.
6. determine the land area, within one acre per twenty acres, of areas having triangular, rectangular, trapezoidal, trapezium or curved boundaries using land measurements and set formulas.

CONTENT:

I. Identifying types of public land surveys
   A. using the metes and bounds system
   B. using the rectangular system
   C. interpreting deeds and legal descriptions

II. Making linear measurements on level ground
   A. pacing
   B. chaining
      1. identifying units of measure
      2. identifying the equipment and its proper use
      3. caring for the equipment
      4. recording field notes

III. Making linear measurements on sloping ground
   A. pacing
   B. breaking chain

IV. Differential levelling
   A. using the level

        1. transporting instruments safely
        2. setting up the instrument
        3. adjusting the instrument

    B. reading the rod

        1. red numbers - feet
        2. black numbers - inches or tenths of feet
        3. black and white spaces - hundredths of feet

V. Establishing angles and bearings with a transit or compass

    A. transporting the instrument safely
    B. setting up the instrument
    C. reading the compass and vernier
    D. allowing for angle of declination

VI. Determining acreage in land areas

    A. measuring boundaries
    B. making calculations

TEACHER ACTIVITIES:

1. Demonstrate the use and care of all equipment.

2. Set up surveying courses for student exercise.

STUDENT ACTIVITIES:

1. Determine the type of legal survey used in the state and practice locating specified sites or land areas from deeds or land descriptions.

2. Chain a 100 foot distance on level ground, determine the number of paces needed to pace the distance, and calculate the length of each pace.

3. Chain and pace a specified distance on sloping ground to determine the effects of slope on length of pace.

4. Practice reading the Philadelphia rod.

5. Do a differential levelling exercise on a predetermined course.

6. Map their work to practice mapping skills, especially the use of scales.

EVALUATION:

1. Evaluate students' description of the basic types of legal surveys.

2. Have each student measure distances by pacing ground. Evaluate the students by chaining the same distances with accuracy to be within limits set in the performance objectives.

3. Have each student measure distances by pacing on sloping ground. Evaluation should be in accordance with the limits set in the performance objectives.

4. Have each student establish angles using a transit or compass with accuracy to be within one degree of the specified angle.

5. Rate students' solution to a differential levelling problem.

6. Rate student' ability to determine the land area in acres of regularly and irregularly shaped land areas by making all necessary measurements needed for calculation and using set formulas.

RESOURCES:

1. Transit and rod or a staff compass.
2. Steel tape and chaining pins or gunter's chain.
3. Hand compass.
4. Field notebooks.
5. Deeds or legal land descriptions.
6. Level.
7. Rod.

BIBLIOGRAPHY:

1. *Conservation Aide IV - Surveying*, Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, Columbus, Ohio, 1972.

2. Davis, S., *Elementary Plane Surveying*, McGraw-Hill, 1960.

3. Forbes, R.D., *Forestry Handbook*, Ronald Press, 1955.

4. Schwab, Glenn O., Frevert, Richard K., Barnes, Kenneth K., and Edminster, Talcott W., *Elementary Soil and Water Engineering*, John Wiley and Sons, New York, New York, 1965.

MEDIA:

1. VEP filmstrips, Cal-Poly:

"Use of the Level: Setting up the Instrument"
"Use of the level: Reading the Rod"
"An Exercise in Differential Leveling"

NATURAL RESOURCES CURRICULUM

UNIT: Gamebird Propagation

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, Fall.

OBJECTIVES: The student will be able to:

1. identify and select gamebird species to propagate that an economic evaluation indicates would be profitable.
2. given the species and desired number of birds to be propagated, develop a breeding, reproduction, and incubation program that will produce gamebirds with less than 10% loss.
3. carry out a plan for brooding a designated species of gamebirds which will result in a minimum loss of birds.
4. develop a feeding system and balance rations for a given lot of growing birds and breeders which will maximize gains per pound of feed and minimize wastage.
5. prescribe and implement a plan for preventing and/or curing common diseases and parasites which afflict gamebirds.
6. using special crates and catching nets, handle and transport gamebirds in a manner which will prevent injury and feather loss.

CONTENT:

I. Selecting the species to propagate

   A. identifying gamebird species and characteristics
   B. determining sources of eggs or chicks
   C. determining market demand
   D. evaluating costs and returns

      1. fixed costs
      2. variable costs
      3. gross returns
      4. net returns

II. Breeding and reproduction methods

   A. identifying the parts of the reproductive system of male and female birds
   B. identifying mating systems

      1. purposes of outbreeding
      2. purposes of inbreeding
      3. purposes of crossbreeding
      4. purposes of line breeding

   C. incubating gamebird eggs

        1. controlling lice
        2. controlling [illegible]
        3. developing [illegible]

III. Brooding and rearing gamebirds

    A. selecting the housing and equipment

        1. determining the types and sizes of housing needed
        2. selecting the ventilation system
        3. determining insulation requirements
        4. selecting the lighting, watering, and feeding systems
        5. selecting and maintaining the equipment

    B. managing [illegible]

        1. determining temperature requirements
        2. determining floor and water space requirements
        3. determining litter requirement
        4. selecting the [illegible]ing system

IV. Feeding gamebirds

    A. identifying the digestive system parts and their functions
    B. identifying the six classes of nutrients, their functions and sources
    C. identifying [illegible] nutrient requirements

        1. chicks
        2. growing poults
        3. breeders

    D. formulating rations

        1. determining availability and costs of feeds
        2. determining nutritional value
        3. determining palatability and ease of feeding

V. Controlling diseases

    A. identifying and controlling contagious and non-contagious infectious diseases

        1. recognizing symptoms
        2. determining causes
        3. identifying prevention techniques
        4. prescribing treatment and control

    B. identifying non-infectious diseases

        1. identifying nutritional diseases

            recognizing symptoms
            determining causes
            identifying prevention techniques
            prescribing treatment

2. identifying traumas
3. identifying inherited diseases and defects

C. identifying and controlling parasites

1. identifying internal parasites

a. recognizing the symptoms
b. determining prevention techniques
c. prescribing treatment and control

2. identifying external parasites

a. recognizing the problem
b. determining prevention techniques
c. prescribing treatment and control

D. maintaining sanitation

1. controlling moisture
2. disinfecting
3. maintaining proper litter

VI. Handling and transporting gamebirds

A. catching the birds
B. handling birds
C. protecting birds during transportation

TEACHER ACTIVITIES:

1. Have available slides, mounts, pictures and books to aid students in bird identification.

2. Demonstrate proper dissection technique.

3. Arrange field trips to local game farms to observe facilities.

4. Contact a resource person to explain disease symptoms and to direct post mortum examinations by students.

5. Arrange with the Department of Environmental Protection to release pen raised birds.

STUDENT ACTIVITIES:

1. Use slides, mounts, movies and field trips for gamebird identification.

2. Dissect a male and female bird; draw and label the parts.

3. Hatch gamebird eggs in the classroom in an incubator and raise the birds on the school land laboratory or on a class member's land.

4. Take a field trip to game farms to observe facilities used for brooding and rearing gamebirds.

5. Dissect a bird's digestive system and draw and label the parts.
6. Practice formulating rations for chicks and growing poults.
7. Use a resource person to explain disease symptoms in live birds and assist the students in performing a post-mortum examination.
8. Release the gamebirds produced in a previous activity when they are of appropriate maturity under supervison of conservation officer.

EVALUATION:

1. Have each student prepare a budget for raising a selected species and number of gamebirds from incubation to market. The budget should contain fixed and variable costs as well as gross and net returns.
2. Have the students identify the parts of the male and female reproductive systems of gamebirds on diagrams prepared by the teacher.
3. Specify a species and number of gamebirds for which the students are to indicate the housing requirements, space requirements, and other environmental conditions that would be needed to promote the birds' health and vigor.
4. Have the students develop a suitable ration for a species of gamebirds at a designated age. The ration should be evaluated as to its nutritional value, cost, and palatibility.
5. Develop a matching test in which the students will match common gamebird diseases with their cause, vector, prevention methods or cure.
6. Have the students list the safety precautions they should use when handling and transporting gamebirds to prevent injury or feather loss.

RESOURCES:

1. Refrigerator.
2. Dissecting trays and kits.
3. Tissue forceps.
4. Thumb forceps.
5. Wire mesh strainers.
6. Rubber aprons.
7. Demonstration incubator brooder.
8. Housing, pens, and equipment for raising gamebirds.

BIBLIOGRAPHY:

1. Catalogue of Game Breeding Information, current edition, National Shooting Sports Foundation, Riverside, CA.
2. Manageing Gamebirds, Bulletin No. 3-692, Michigan State University Extension Service, East Lansing, Michigan, 1972.
3. Sheid, Dan W., Raising Game Birds, NASCO.

MEDIA:

1. Gamebird Management, 2 part filmstrip depicts management of pen reared and wild birds. Available from Vocational Education Productions.

NATURAL RESOURCES CURRICULUM

UNIT: Introductory Taxidermy (Fish)

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, November, December.

OBJECTIVES: The student will be able to:

1. prepare fish specimens as live mounts using techniques of plaster cast molding.
2. perform plastic and/or resin casting and cast cleaning.
3. finish and paint mounts.
4. mount specimen on wall.

CONTENT:

- I. Determination of the relationship of taxidermy to natural resources occupations
    - A. types of applications
        - 1. museum taxidermy
        - 2. trophy taxidermy
        - 3. novelty taxidermy
    - B. experience required
    - C. economic potential
    - D. skills required for proficiency
- II. Skills development
    - A. preliminary preparation of fish
        - 1. color photographs from different angles with repeats
        - 2. sketch and notes of body coloration
        - 3. skin protection of freshly caught fish
        - 4. freezer wrapping, freezer placement
    - B. preparing fish molds
        - 1. selection of molding plaster grade
        - 2. mixing technique for molding plaster
        - 3. preparing fish for molding plaster
            - a. slime removal
            - b. skin tightening
            - c. show side selection
            - d. pectoral and ventral fin removal
            - e. belly contouring
            - f. shelf building
            - g. body positioning
            - h. mouth molding

4. plaster application
    a. first layer technique
    b. second layer reinforcement
    c. second layer application/reversal and backside layer application
    d. fin molding
    e. separating mold halves

5. preparing plaster mold for resin casting
    a. shellac application for pinhole detection
    b. shellac/alcohol mix application(s) to reduce porosity
    c. backside mold half preparation
        i. fin mold removal (dorsal and anal fins)
        ii. back "cutaway" for mounting board
    d. mixing and applying "separator" to mold
    e. selecting and mixing proportions of catalyst and resin

6. application of the resin
    a. first application technique
        i. powdered glass mixture
        ii. thickened paste
    b. second application technique
        i. fiberglass or equivalent cloth application
        ii. liquid consistency
    c. separation of finished casts from mold
    d. trimming cast excess, filling imperfections
    e. attaching halves together
    f. filling imperfections along seam line/cutting excess

7. fin attachment, glass eye placement
8. body painting
    a. paint type and selection
    b. base paint applications
    c. body painting techniques
        i. oil paint blending
        ii. finish spray overcoating

TEACHERS ACTIVITIES:

1. Arrange a field trip to a loca museum for students to view different types of live mount specimens.

2. Demonstrate skills in preparing fish and fish molds, resin casting fin attachment, eye placement and body painting.

3. Acquire enough specimens for class use.

STUDENT ACTIVITIES:

1. Locate local taxidermists, museums, and novelty shops.

2. Speak with local taxidermist.

3. Prepare fish specimen for plaster, mix plaster, prepare sand box, pour and reinforce plaster.

4. Prepare plaster molds for resin, mix and apply resins, attach both halves and perform finishing techniques for mounting.

5. Perform research on illustrations and photographs from books and magazines.

6. Use assorted tools for shaping and molding.

7. Research the going rate for live mount specimens.

EVALUATION:

1. Have student demonstrate skills needed to make a plaster mold of acceptable quality.

2. Have student list all of the tools and supplies needed to perform a "resin cast taxidermy operation".

3. Student should describe the method of making a "resin cast" duplicate of a fish specimen.

4. Student should construct a "resin cast" duplicate. Evaluation should be made of each phase of the construction: mold, cast, cast finishing and cast painting.

RESOURCES:

1. Peabody Museum, Yale University, New Haven, CT.

2. Taxidermists local to the area.

3. J.W. Elwood Supply Co., Inc. (Taxidermists' supplies), 1202 Harney, Box 3507, Omaha, Nebraska, 68103.

4. Herters', Inc., Mitchell, South Dakota.

5. Marine supply centers, (for items such as epoxy resin, plaster of paris, etc.)

6. Supplies needed:

glycerine
epoxy resin
plaster of paris: artist grade
isopropyl alcohol
sand: fine
electric drill
powdered alum
newspaper
spray paints: white and silver
  base paints, pearl matte,
  clear spray plastic
fresh or frozen fish specimens
  1½ pounds or more

beeswax
vaseline
parafin
shellac
files, sandpaper (fine),
grinding bits
vinegar
dental picks
brushes
cups for resin and paint
fiberglass cloth
artists oil paints
paint thinner
artist's Japan drier

BIBLIOGRAPHY:

1. Cappel, Leo J., A Guide To Model Making and Taxidermy, A.H. and A.W. Reed, London, England.

2. Herters Guide to Modern Taxidermy, Herters, Inc., Mitchell, SD.

3. McClane, A.J., The Fisherman's Encyclopedia.

4. Migdalski, Edward C., How To Make Fish Mounts and Other Fish Trophies, Ronald Press, New York, NY, 1960.

MEDIA:

1. ______________________________

2. ______________________________

NATURAL RESOURCES CURRICULUM

UNIT: Outdoor First Aid

LENGTH: 3 Weeks

WHEN TAUGHT: Fall, Winter, or Spring - Grades 11, 12.

OBJECTIVES: The student will be able to:

1. identify the importance, scope and limitations of first aid in treating accident victims in agricultural resources occupations. The effects of personal injuries to persons employed in agricultural occupations, especially those working in remote areas, can be minimized with the use of proper first aid techniques.

2. use the following first aid techniques in simulated situations with competency indicated in the First Aid Textbook:

    A. treating wounds
    B. treating sprains and fractures
    C. treating for shock
    D. treating poisoning
    E. treating poisonous bites and plant poisoning
    F. treating burns
    G. administering artificial respiration
    H. transporting injured persons

CONTENT:

I. Determining the Scope of First Aid

    A. identifying agricultural resources occupations requiring first aid skills
    B. identifying types of first aid skills needed in agricultural resources occupations
    C. identifying the limitations of first aid
    D. identifying individual responsibility and liability

II. Using First Aid Techniques

    A. treating wounds

        1. identifying type of wound
        2. identifying and using first aid methods

    B. treating sprains and fractures

        1. identifying symptoms
        2. identifying and using first aid methods

    C. treating for shock

        1. identifying signs and symptoms
        2. identifying causes
        3. identifying and using first aid methods

D. treating burns

  1. using first aid on thermal burns
  2. using first aid on chemical burns
  3. treating sunburn and excessive heat problems
  4. treating excessive cold problems

E. treating poisoning

  1. common chemical poisons and their effects
  2. identifying signs and symptoms
  3. administering first aid

F. treating poisonous bites and plant poisoning

  1. identifying the cause of the poisoning

     a. identifying poisonous snakes in the region
     b. identifying poisonous arachnids and insects
     c. identifying poisonous plants

  2. administering first aid

G. using artificial respiration and cardiopulmonary resucitation

  1. determining conditions when artificial respiration and cardiopulmonary resucitation is needed
  2. administering artificial respiration and cardiopulmonary resucitation

H. transporting injured persons

  1. identifying situations requiring movement of patients
  2. preparing the patient
  3. identifying methods of transfer

TEACHER ACTIVITIES:

1. Instructor will contact persons involved in Agricultural Resources occupations to discuss the first aid requirements in their occupations.

2. Instructor will set up simulated wounds for students to practice first aid skills.

3. Instructor will contact representatives of local Red Cross chapter, hospital or emergency services as resource persons to demonstrate first aid equipment, supplies and techniques.

STUDENT ACTIVITIES:

1. Set up simulated wounds using students as patients and have others administer firs aid.

2. Practice using different methods of artificial respiration with students simulating patients.

3. Have the student practice using an approved first aid snake bite kit under simulated situations.

4. Have students find the names and addresses of area emergency services, poison treatment centers, etc.

5. Have students prepare a bulletin board showing poisonous and non-poisonous snakes, spiders and insects common to the area.

EVALUATION:

1. Have the students list five agricultural resources occupations and at least four first aid requirements for each occupation.

2. Have each student demonstrate at least four first aid skills assigned by the teacher. Evaluate the students as to correctness of procedure.

3. If the teacher is a certified instructor, give the test for certification in CPR and/or basic first aid.

RESOURCES:

1. First aid kits

2. Snake bite kits

BIBLIOGRAPHY:

1. Collins, Henry Hill, Jr., Complete Field Guide To American Wildlife, New York, New York: Harper and Rowe Publishers, Inc., 1959, 683 pages.

   This text contains information and color pictures of the poisonous snakes found in the United States

2. First Aid Textbook, Washington, D.C.: The American National Red Cross, 1977, 268 pages.

   This text will be a valuable reference for the teacher and student while learning and practicing first aid techniques

3. Grant, Harvey and Murray, Robert, Emergency Care, Bowie, Maryland: Robert J. Brady Co., 1978 546 pages.

   Excellent manual used in the training of Emergency Medical Technicians

MEDIA:

1. If you are a certified American National Red Cross instructor, you will have access to all of their training films and materials.
2. "By Nature's Rules": A film on hypothermia, Jim Lawless Motion Picture Consultants, Inc., 1545 N.E. 130th Street, Seattle, Washington, 98125

NATURAL RESOURCES CURRICULUM

UNIT: Recreation

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, anytime of year.

OBJECTIVES: The student will be able to:

1. using federal, state and local data, identify the demands by the public for different types of outdoor recreation experiences in the student's region.
2. prepare a long-range development plan (5-10 years) for a selected enterprise considering initial and additional developments and management requirements.
3. using cost and return data from similar enterprises, prepare a budget for a designated enterprise which would include fixed costs, variable costs, gross returns, net returns and labor management income.
4. when given a specific site and enterprises to be established, prepare a short-term development plan which would include construction, advertising and initial management needs.
5. using federal, state and local codes and regulations, indentify laws pertaining to a designated outdoor recreation enterprises.
6. using the different media, develop a complete public relations program for a given outdoor recreation enterprise.
7. select an appropriate site for a camping area with regard to physical and socioeconomic factors which will contribute to enterprise success.
8. select supplemental enterprises for a camping area which would be most profitable.

CONTENT:

I. Evaluating the demand for outdoor recreation

II. Selecting additional outdoor recreation enterprises for a community

   A. inventorying current enterprises

III. Analyzing the site potential

   A. inventorying the natural resources

      1. water
      2. existing vegetation
      3. land area
      4. drainage
      5. soil
      6. topography

IV. Analyzing the accessibility to the area
  A. roads
  B. services

V. Selecting the type of recreation enterprise for a designate site
  A. determining alternative site development possibilities
    1. matching enterprise requirements with site characteristics
    2. determining local area factors
    3. determining community acceptance
    4. identifying owner/operator management abilities and objectives
    5. determining the demand for the alternative enterprise

VI. Planning the selected enterprise
  A. preparing a long-range development plan
  B. preparing the cost-return estimate
    1. determining investment and fixed costs
    2. determining operating costs
    3. identifying gross and net returns
    4. calculating labor and management income

VII. Preparing and implementing the short-term development plan.
  A. identifying initial construction needs
  B. determining publicity needs
  C. investigating insurance needs

VIII. Determining available financial and technical assistance
  A. identifying federal assistance programs
  B. identifying state and local government assistance programs
  C. identifying sources of private assistance

IX. Determining insurance program needs
  A. identifying kinds of insurance needs
  B. determining amounts of insurance needs
  C. identifying sources of insurance

X. Developing the public relations program
  A. selecting the media to use
  B. determining the amount of public relations needed
  C. developing public relations material

XI. Selecting the type of camping enterprises to establish

- A. determining investment costs
- B. identifying management skills and time required

XII. Selecting a site for a camping area

- A. determining physical factors
  - 1. identifying water resources
  - 2. identifying topographical factors and natural attractions

  - 3. evaluating vegetative factors

- B. determining socioeconomic factors
  - 1. evaluating geographical location
  - 2. determining economic and business management factors

XIII. Laying out the camping area

- A. locating campsites and facilities
- B. developing road network
- C. locating improvements

XIV. Providing for sanitation and safety

- A. developing the water supplies
- B. developing the sanitation system
- C. developing and maintaining the electrical system
- D. controlling insects and pests

XV. Developing supplemental enterprises

- A. stores and concessions
- B. rentals

TEACHER ACTIVITIES:

1. Organize field trips to local, state, municipal and/or private recreation areas, have students interview owners/managers.

2. Contact local park administrators to determine needs to be approached by students.

STUDENT ACTIVITIES:

1. Inventory present outdoor recreation enterprises in the community.

2. Take field trip to existing outdoor recreation

3. Develop a plan for a selected outdoor recreation enterprise using a selected site.

4. Develop advertising program for a given enterprise. In developing the advertising each student should develop a brochure and write one item of advertising copy.
5. For a designated outdoor recreation area, develop the insurance needs that would apply to enterprise.
6. Determine the source of financial assistance that may be required to develop the outdoor recreation plan.
7. Consult with State personnel to determine needs of public areas.
8. Take state or municipal specifications and construct picnic tables, grills or signs for a local park or forest.

EVALUATION:

1. Each student will present their recreational inventory of the community.
2. Each student will present a plan for campground development regarding an assigned peice of land.
3. Evaluate the the completed advertising brochure.
4. Evaluate the student's financial plan for starting a commercial campground.

RESOURCES:

1. Visit state parks and private campgrounds to determine differences in services offered.
2. Have insurance agent speak on uses of insurance.
3. Have financial officer, bank executive or land bank officer speak on developing credit and borrowing.
4. Have local town planner or recreation director speak to class on recreational areas and activities as well as general land use planning.

NATURAL RESOURCES CURRICULUM

UNIT: Timber Management Practices

LENGTH: 6 Weeks

WHEN TAUGHT: Grade 11 or 12, Fall, Winter, or Spring.

OBJECTIVES: The student will be able to:

1. prescribe for a specific forest product on a given plantation of any age the timing, method and intensity of the next weeding, thinning and pruning.
2. when given a forest area and timber stand improvement practices to be implemented, complete the prescribed practices with competence required to obtain the desired results.
3. identify and implement the different types of harvest cuttings that are used in even-aged and uneven-aged forests in his area with complete accuracy.
4. identify the different government and professional forest management organizations and explain the services they provide forest landowners.

CONTENT:

I. Selecting timber stand improvement practices
    A. analyzing the forest
        1. determining forest condition
        2. determining forest composition
        3. determining forest age and growth
    B. identifying management goals

II. Implementing timber stand improvement practices
    A. weeding a forest plantation
        1. using mechanical methods
            a. operating the equipment
            b. maintaining the equipment
        2. using chemical methods
            a. selecting chemicals
            b. operating the equipment
            c. maintaining the equipment
    B. Thinning a forest plantation
        1. determining the method of thinning

            - a. using the selection system
            - b. using row thinning

        - 2. operating and maintaining the equipment

    - C. making pre-commercial and subsequent thinnings

        - 1. making release (liberation) cuttings
        - 2. making improvement cuttings
        - 3. selecting and applying chemicals
        - 4. operating and maintaining the equipment

    - D. pruning the forest plantation.

        - 1. determining the best season for pruning
        - 2. determining age of the stand and amount of pruning required
        - 3. operating and maintaining the equipment

III. Identifying types of harvest cuttings

- A. identifying types of cuttings used in even-aged forests

    - 1. clear cutting
    - 2. seed-tree cutting
    - 3. shelterwood cutting
    - 4. other

- B. identifying types of cuttings used in uneven-aged forests

    - 1. selective cutting
    - 2. diameter limit cutting
    - 3. other

IV. Identifying advantages and disadvantages of each type of harvest cutting

- A. ease of logging operation
- B. income produced
- C. effect on soil, water and wildlife
- D. effect on forest regeneration

V. Identifying forest management services

- A. determining federal, state and county government agencies and services
- B. determining professional and private conservation organizations and services
- C. identifying forest research organizations and services

TEACHER ACTIVITIES:

1. Arrange field trips to forested areas that have been recently harvested.

2. Demonstrate safe equipment handling by students.
3. Use increment borer to demonstrate age and growth of trees.
4. Invite representatives of different forest organizations to discuss programs and services.
5. Arrange a field trip to forest experiment station or research laboratory.
6. Contact the Harvard Museum in Peterboro Massachusetts to arrange a field trip.

STUDENT ACTIVITIES:

1. Interpret inventory information.
2. Recommend timber stand improvement practices on a given stand of timber and be able to defend their recommendations.
3. Demonstrate safe equipment operation while implementing appropriate timber stand improvement practices on the school forest or on a cooperator's woodlot.
4. Use an increment borer to show the effects of timber stand improvement practices on the growth rate of trees.
5. Visit forest areas that have been harvested to observe the type of harvest cutting used and its effects on the soil, water, wildlife and remaining forest.

EVALUATION:

1. Have each student determine the timber stand improvement practices needed on a given woodlot or plantation. Have a service forester or forest industry employee assist in the evaluation of the student's recommendations and indicate his observations concerning needed timber stand improvements.
2. Have each student demonstrate his ability to operate and maintain tools and equipment used in timber stand improvement. The evaluation should include correctness of equipment operation and maintenance as well as observance of safety precautions.
3. Have each student define each harvest cutting method and list their advantages and disadvantages.
4. Have each student list six forest management organizations and describe the services they provide.

RESOURCES:

1. Hard hats, eye protection, ear protection, chaps, etc.
2. Chain saws.

3. Tree increment borer.
4. Pruning equipment.
5. Paint (marking) guns.
6. Tree Injectors.
7. Chemical sprayers.

BIBLIOGRAPHY:

1. Management of Forest Resources for Multiple Use, Dept. Of Agricultural Education, The Pennsylvania State University, University Park PA, 1970.
2. Managing the Family Forest, Bulletin No. F 2187, Dept. Of Agriculture, U.S. Government Printing Office, Washington, D.C., 1962.
3. Products From Our Forests - Their Manufacture and Use, Dept. of Agricultural Education, The Pennsylvania State University, University Park, PA., 1970.
4. Forestry, Merit Badge Series, Boy Scouts of America, North Brunswick, New Jersey, 1976.
5. Leak, W.B., Solomon, D.S., Filip, S.M., A Silvicultural Guide for Northern Hardwoods in the Northeast, U.S.D.A. Forest Service Research Paper, N.E. - 143, 1969.
6. Roach, B.A., Gingrick, S.F., Even-Aged Silviculture for Upland Central Hardwoods, Agriculture Handbook #355, U.S.D.A. Forest Service, 1968.
7. Forbes, R.D., Woodlands for Profit and Pleasure, The American Forestry Assoc., 1319-18th Street N.W., Washington, D.C., 20036.
8. Managing the Small Forest, Bulletin No. 1989, U.S.D.A., 1957.
9. Forest Improvement Cutting, Cooperative Extension Service, The University of Connecticut, Storrs.
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11. Forest Tree Pruning Guide, Publication #361, Cooperative Extension Service, University of Massachusetts, Amherst.
12. Weeding Forest Stands, Publication #372, Cooperative Extension Service, University of Massachusetts, Amherst.
13. Thinnong Forest Stands, Publication #376, Cooperative Extension Service, University of Massachusetts, Amherst.
14. Forestry Incentives Program, U.S.D.A. Agricultural Stabilization and Conservation Service.

15. Improve Your Woodlot by Cutting Firewood, U.S.D.A. Forest Service Northeastern Area, State & Private Forestry, Upper Darby, PA, 19082.

16. Field Reference Handbook for Service Forests, U.S.D.A. Forest Service Northeastern Area.

17. Log Rule and Lumber Scale, U.S.D.A. Forest Service Northeastern Area.

18. Major Specifications for Forest Service Hardwood Sawlog Grades, U.S.D.A. Forest Service Northeastern Area.

19. The International Log Rule/Volume Table/International Rule Tree Scale, U.S.D.A. Forest Service Northeastern Area.

20. Logging Farm Wood Crops, Bulletin #2090, U.S.D.A.

MEDIA:

1. ______________________________

2. ______________________________

SR 70

NATURAL RESOURCES CURRICULUM

UNIT: Tree Identification

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, early Fall or late Spring.

OBJECTIVES: The student will be able to:

1. identify by scientific and/or common name the economically important trees found in Connecticut.
2. identify trees by matrue bark or twig samples.
3. develop and/or use a key for use in identifying trees.

CONTENT:

I. Identifying trees

- A. using leaf characteristics
    1. determining type of leaf arrangement
    2. identifying type of margin
    3. considering size and shape
    4. considering texture and color
- B. observing flowers
- C. observing type of fruit present
    1. identifying nuts
    2. identifying berries
    3. identifying cones
    4. identifying winged fruit pods
- D. using twig characteristics
    1. identifying characteristics of buds and leaf scars
    2. considering pith characteristics
    3. considering color
- E. using the bark
    1. determining roughness
    2. determining color
- F. using taste and smell
- G. observing tree growth characteristics
    1. considering shape of crown
    2. considering persistence of dead branches
    3. buttressing or swelling of lower trunck

H. observing the site conditions

  1. considering topographic features
  2. considering soil type, condition and drainage
  3. considering surrounding vegetation

I. identifying the range or distribution of tree species

  1. considering the soils present
  2. considering the climate

J. identifying hybrid species

TEACHER ACTIVITIES:

1. Have an employee in the forest industry stress importance of correct tree identification.

2. Take classes to forests fo identify trees growing on different sites.

3. Provide and demonstrate the use of a dichotomous key.

4. Make up cards containing the identifying characteristics of the trees to identify.

5. Set up a tree identification trail on the school land laboratory.

STUDENT ACTIVITIES:

1. Use tree identification references and tree keys for the state or region to identify various trees on the school land laboratory by their common and/or scientific names.

2. Develop with tree identification keys, diagrams and leaf, bud and twig specimens of the economically important trees found in the area.

EVALUATION:

1. Set up several tree identification trails as a practical exam, students must get at least eighty percent of the trees correct or be retested.

2. On the same tree identification trail, during the winter if possible, have class identify the same trees with twig and bark samples, with at least fifty percent accuracy.

RESOURCES:

1. Woodlot containing as many of the economically important native species as possible.

2. Leaves, bark, twigs, fruits for tree identification. Pictures, slides, filmstrips and other similar aids can be also used.

3. Plant keys for common trees.

BIBLIOGRAPHY:

1. Collinwood and Brush, Knowing Your Trees, American Forestry Assoc.
2. Fenska, Richard R., The Complete Modern Tree Experts Manual, Dodd, Mead & Co., New York 1959.
3. Gray, Asa, Manual of the Botany of the Northern United States, Ivison and Phinney, 1858.
4. Grimm, William Carey, How to Recognize Trees, Castle Books, New York, 1962.
5. Important Trees of Eastern Forests, U.S. Dept. of Agriculture, Forest Service, 1968.
6. Peattie, Donald, A Natural History of Trees, Bonanza Books, 1976.

MEDIA:

1. ____________________

2. ____________________

NATURAL RESOURCES CURRICULUM

UNIT: Water Supply and Quality Determination

LENGTH: 3 Weeks

WHEN TAUGHT: Grade 11 or 12, Spring.

OBJECTIVES: The student will be able to:

1. write a description of the hydrolic cycle processes which should include precipitation, evaporation, transpiration and condensation.
2. when given a specified land area, identify the available surface water and ground water supplies which should include waterways, water impoundments and aquifers.
3. when given a specified community size and location, estimate the annual, monthly and daily demand for water to the satisfaction of the instructor.
4. using water test kits, determine the quality of a given sample of water within the limits of the testing equipment.
5. when given a specified watershed, identify the present and potential sources and types of water pollution and their effects on the natural resources of the area.
6. when given a watershed with identified water pollution sources, determine the alternative methods which could be used to correct the problem to meet local and/or state pollution regulations.

CONTENT:

I. Identifying the hydrolic cycle processes

    A. precipitation
    B. evaporation
    C. transpiration
    D. condensation
    E. runoff
    F. infiltration
    G. percolation

II. Determining available surface water and ground water supplies

    A. measuring precipitation
    B. determining flowing water supplies
    C. determining water impoundment supplies
    D. identifying ground water supplies

        1. aquifers and groundwater movement
        2. springs
        3. artesian wells
        4. drilled wells

III. Estimating community demands for water

A. determining demand factors

1. community size
2. living standards
3. climate
4. water quality

B. identifying major water users

1. domestic usage
2. industrial usage
3. agricultural demands
4. commercials

IV. Evaluating water quality

A. determining water quality

1. microorganism/coliform
2. taste
3. odor

B. determining physical quality

1. hardness
2. corrosiveness
3. color/turbidity

C. determining chemical quality

1. pH
2. oxygen
3. carbon dioxide
4. nitrate
5. phosphate
6. salinity
7. acidity
8. alkalinity
9. hardness

D. identifying natural and man-made pollutants

1. oxygen-demanding wastes
2. disease-causing agents
3. plant nutrients
4. synthetic organic chemicals
5. inorganic chemical and mineral substances
6. sediment
7. radioactive substances
8. heat

V. Identifying present and potential water pollution sources

- A. domestic pollution
- B. agricultural pollution
- C. industrial pollution
- D. identifying effects of pollution
    - 1. fish
    - 2. wildlife
    - 3. vegetation
    - 4. recreational water usage
    - 5. water potability
- E. identifying methods of water treatment
    - 1. aeration
    - 2. flocculation
    - 3. filtration
    - 4. chlorination

VI. Identifying methods of water pollution control

- A. watershed management and protection
- B. disposal of pollutants without treatment
    - 1. dilution
    - 2. irrigation
    - 3. lagoons
- C. treatment methods
    - 1. primary, secondary, tertiary and advanced methods
    - 2. disinfection and deodorization
    - 3. private disposal systems

TEACHER ACTIVITIES:

1. Have a Soil Conservation Service representative discuss sources and amounts of water in the area.

2. Arrange a field trip to a watershed.

3. Arrange field trips to local water purification and waste water treatment plants.

4. Prepare water samples for students to test.

STUDENT ACTIVITIES:

1. Make a terrarium so that they can observe many of the processes which occur during the hydrolic cycle.

2. In sunlight, set up a demonstration using sweet potatoes in containers of water to show water loss through transpiration.

3. Determine the average inches of rainfall in an acre area and convert it into gallons.

4. Read the home water meter at the same time daily for 30 days and determine the average daily water consumption for each family.

5. Locate the three largest users of water in the community and determine their daily water requirements.

6. Bring in a sample of water from a waterway, water impoundment or home water supply and test it to determine its quality.

7. Take a field trip to a watershed and locate possible pollution sources. Collect samples from these sources and analyze them.

8. Identify the methods being used in the community to control water pollution including wastewater treatment installations, wastewater lagoons, and private disposal systems. Analyze each for their effectiveness.

EVALUATION:

1. Have each student diagram the hydrolic cycle and define all terms that should be included.

2. Assign the students a land area for wich they are to calculate the volume of water flowing in the waterways and amount of water in the water impoundments.

3. Have the students calculate the monthly demand for water in a specified community when given the number of homes and their average daily consumption, the number and size farms, and any industrial usage.

4. For a given water sample previously tested by the instructor, have each student determine the water quality and presence of any pollutants. The students should be evaluated for correctness of technique and test results for which some error should be expected.

5. Develop a matching test in which the students are to match different pollutants commonly found in watersheds with their most probable sources.

6. Give the students hypothetical situations in which water pollutants and their sources have been defined. Have each student indicate the methods which could be used to solve the problems.

RESOURCES:

1. Water test kits - water control and water pollution.

2. Rain gauge.

BIBLIOGRAPHY:

1. A Connecticut Water Primer, Connecticut Cooperative Extension Service, Storrs, CT.
2. Planning for an Individual Water System, Athens, Georgia: Engineering Center, American Association for Vocational Instructional Materials, 1973.
3. A Primer on Ground Water, U.S. Department of the Interior, U.S. Government Printing Office, Washington D.C., 1970.
4. A Primer on Water, U.S. Department of the Interior, U.S. Government Printing Office, 1960.
5. A Primer on Water Quality, U.S. Department of the Interior, U.S. Government Printing Office, Washington D.C., 1965.
6. A Primer on Waste Water Treatment, Environmental Protection Agency, U.S. Government Printing Office, Washington D.C., 1971.
7. Renn, Dr. Charles E., Investigating Water Problems, LaMotte Chemical Products Company, Chestertown, MD, 1978.
8. Renn, Dr. Charles E., A Study of Water Quality, LaMotte Chemical Products Company, Chestertown, MD, 1968.
9. Renn, Dr. Charles E., Our Environment Battles Water Pollution, LaMotte Chemical Products Company, Chestertown, MD, 1969.
10. Testing and Improving the Home Water Supply, Connecticut Cooperative Extension Service, Storrs, CT.
11. Water Quality Standards, Department of Environmental Protection, State Office Building, Hartford, CT.

MEDIA:

1. ____
2. ____

SR 78

NATURAL RESOURCES CURRICULUM

UNIT: Wildlife Management

LENGTH: 6 Weeks

WHEN TAUGHT: Grade 11 or 12, October-November.

OBJECTIVES: The student will be able to:

1. explain the historical development of the "conservation ethic" in the United States.
2. discuss the positive and negative aspects of wild animal populations.
3. define the terms: wildlife, game and game management.
4. apply scientific technique to solve problems.
5. identify life zones of the world and representative flora and fauna.
6. explain the process known as "ecological succession".
7. define the terms: "range" and "carrying capacity".
8. identify the factors that influence wildlife populations.
9. utilize basic censusing techniques.
10. know basic breeding patterns and requirements of wildlife as well as factors that might lower productively.
11. know basic aging and sexing techniques to be used on wildlife.
12. define the term "predator" and be able to list examples.
13. know the pros and cons of predator control.
14. identify different types predator controls.
15. be familiar with the laws concerning wildlife in Connecticut.
16. identify the benefits and shortcomings of stocking programs.
17. identify the benefits and limitations of refuges.
18. understand the term "habitat improvement".
19. understand how such practices as controlled burning, mowing, seeding, planting, and water level control can improve habitat.
20. explain the general precautions and safety rules for firearms safety at home and in the field.
21. identify ignition system action types, gun parts and ammunition components.

22. discuss the primary rules for safe gun handling.

23. handle firearms safely at home, when transporting and in the field.

CONTENT:

I. History and evolution of game management

   A. historical development of "conservation ethic"
   B. values and negative aspects of wildlife
   C. definitions of wildlife, game, and game management
   D. scientific techniques

II. Wildlife range

   A. life zones
   B. succession
   C. requirements of range

      1. food and water
      2. cover
      3. carrying capacity

III. Wildlife populations

   A. growth patterns
   B. welfare factors and decimators
   C. cycling
   D. censusing and sampling techniques

IV. Productivity

   A. breeding patterns
   B. factors lowering productivity
   C. measurements of area productivity
   D. measurements of biotic productivity
   E. aging and sexing techniques

V. Predator control

   A. determination of diet
   B. types of predation
   C. pros and cons of control
   D. methods of control

VI. Hunting and regulations

   A. role of hunting in management
   B. Connecticut regulations
   C. sportsmanship/hunter ethics
   D. firearms

      1. action types
      2. ammunition
      3. safe handling
      4. loading
      5. carrying

- E. check stations

VII. Stocking

- A. benefits
- B. limitations
- C. considerations before stocking

VIII. Refuges

- A. purpose and values
- B. limitations
- C. types of refuges

IX. Habitat improvement

- A. food
- B. cover
- C. improvement techniques
    1. fire
    2. cutting
    3. mowing
    4. planting
    5. water control
    6. lime and fertilizer

TEACHER ACTIVITIES:

1. Lead class discussions.

2. Contact local conservation officer to help arrange field trips and to speak to class.

3. Contact local gun club to arrange for practical experiences in firing and handling guns.

STUDENT ACTIVITIES:

1. Participate in class discussions led by the instructor.

2. Orally present two magazine article reviews on approved wildlife management topics.

3. View slide presentations of the world's life zones and representative flora and fauna.

4. View films on plant succession, the Whitetail deer in New York State, and the role of hunting in management.

5. Perform basic math computations to solve problems concerning animal populations.

6. Cast plaster animal tracks.

7. Prepare a study skin.

8. Study dental patterns of wild animals.
9. Visit a fish hatchery and a pheasant farm.
10. Participate in pheasant stocking.
11. Visit a deer check station.
12. Implement an individual habitat improvement project.
13. Train and try out for the Natural Resources Contest.
14. Explain safety precautions for firmarms handling.
15. Practice carrying and passing firearms.
16. Practice firing gun properly at local gun club under supervision of instructor with help of club members.

EVALUATION:

1. Evaluate participation in class discussions.
2. Written quizzes and exams.
3. Grade oral magazine article reviews.
4. Student's plaster cast and study skin will be graded.
5. Grade student's personal habitat improvement project.
6. Rate identification of firearm action types and parts.
7. Rate demonstration of safe gun handling.

RESOURCES:

1. State Conservation or Environmental Protection Agency periodicals.
2. Local pheasant farm.
3. D.E.P. deer check station and staff.
4. D.E.P. fish hatchery
5. Project Learn films.
6. Local fish and game club lands.
7. NRA Hunter Safety and Conservation Program, Student's Manual.
8. State of Connecticut Hunting, Trapping and Fishing Abstracts.

BIBLIOGRAPHY:

1. Dasmann, Wildlife Biology, (text).

2. Leopold, Game Management, (text).

3. NRA Hunter Safety and Conservation Program, Instructors' Manual and Supplements.

4. Trippensee, Wildlife Management, (text).

5. The Wildlife Society, Wildlife Management Techniques, (text).

MEDIA:

1. The Care of the Big Horn Sheep. Two part filmstrips discussing the problem of the diminishing Bighorn populations. Filmstrips display the scientific method, available from Prentice-Hall Media, New York.

2. A Question of Hunting. Available through the Department of Environmental Protection, Information & Education, State Office Building, Hartford, Connecticut.

3. Shoot, Don't Shoot. Available through Connecticut Dept. of Environmental Protection.

PLANT SCIENCE CURRICULUM

UNIT: Bedding Plants

LENGTH: 4 weeks

WHEN TAUGHT: Grade 11 or 12, Winter - Spring

OBJECTIVES: The student will be able to:

1. understand that bedding plants require special environmental conditions to develop high quality plants.
2. understand that the time of sowing the seeds will determine the flowering time and plant size.
3. prepare germinating mediums used for the propogation of bedding plants.
4. know the various types of plant containers used in the bedding plant industry.
5. produce several varieties of bedding plants from the seed sowing to flowering or maturity.
6. apply growth regulators in correct proportions and understand how these regulators affect the growth of the plant.

CONTENT:

I. Optimum growing conditions for bedding plants

   A. mist systems
   B. CO_2
   C. temperature
   D. water and feeding
   E. insects and disease

II. Scheduling the crop

   A. seed growing
   B. transplanting
   C. time of bloom
   D. growth of retardents

III. Bedding plant mediums

   A. pasteurization
   B. soil mediums
   C. soiless mediums

IV. Bedding plant containers

A. market pak
B. thin-walled plastic packs
C. thick-walled plastic packs
D. pots and plant bands
E. other

V. Varieties of bedding plants

A. annuals
B. biennial
C. perennial

VI. Growth regulators

A. types
B. dilutions
C. application methods
D. effect on all divisions

TEACHER ACTIVITIES:

1. Demonstrate the procedure followed in preparing bedding plant mediums.

2. Use lecture and laboratory periods to explain environmental conditions needed for high quality bedding plants.

3. Prepare a hand-out which will provide information concerning the sowing dates of bedding plants.

4. Plant containers will be displayed for identification purposes.

5. Demonstrate the procedures followed in seeding, transplanting, and feeding of bedding plants.

STUDENT ACTIVITIES:

1. Sow, transplant and fertilize bedding plants.

2. Develop or mix the different types of mediums used for bedding plants.

3. Become familiar with the various types of containers used for bedding plants.

4. Use a growth retardent on the bedding plants they produce.

EVALUATION:

1. Evaluate students' learning with quizes.

2. Have students demonstrate laboratory techniques.

3. Evaluate individual crops grown in school greenhouse.

RESOURCES:

1. Flats
2. Transplanting
3. Seed
4. Vermiculite and Peat Moss
5. Pearlite, Sand
6. Labels and marking pencils
7. Nursery catalogues
8. Student hand-outs pertaining to the unit
9. Fertilizers

BIBLIOGRAPHY:

1. Ball, George J., *The Ball Red Book*, Geo. J. Ball, Inc., 1965
2. Nelson, Kennard S., *Flower and Plant Production in the Greenhouse*, Interstate Printers and Publishers, Inc., Danville, Ill. 1966
3. Pennsylvania State University, *Poinsettia, Easter Lily, and Bedding Plant Production*, Penn. State University, College of Agriculture, Dept. of Agricultural Education, University Park, 1967
4. Williams, *Greenhouse Flowers and Bedding Plants for Agribusiness Studies*, Interstate, 1975
5. USDA Publications

MEDIA:

1. Bedding Plant - Filmstrip - VEP
2. Bedding Plant Production - Filmstrip - VEP
3. Annuals - Slides - Ohio
4. ____________________

PLANT SCIENCE CURRICULUM

UNIT: Christmas Holiday Production & Marketing

LENGTH: 3 weeks

WHEN TAUGHT: Grades 11 & 12, December

OBJECTIVES: The student will be able to:

1. be familiar with Christmas tree plantation establishment and care.
2. be familiar with assembly production.
3. know characteristics of salesmanship and marketing.
4. construct and decorate wreaths.
5. identify christmas trees and greens.
6. develop characteristics of leadership and responsibilities through group participation.

CONTENT:

I. Production of trees
   A. identification
   B. site selection
   C. plant population
   D. selection of varieties to plant
   E. obtaining plants
   F. planting
   G. care and maintenance of plants
   H. pest control
   I. use and care of tools and equipment

II. Production of wreaths
   A. hauling greens
   B. cutting to proper length
   C. tying
   D. decorating
   E. tagging
   F. pricing
   G. delivery
   H. record keeping
   I. use and care of tools and equipment

III. Salesmanship and marketing
   A. setting up sales area
   B. grading, tagging and pricing trees
   C. customer approach
   D. presenting the merchandise
   E. closing the sale

   - F. making change
   - G. keeping records of sales
   - H. advertising

TEACHER ACTIVITIES:

1. Coordinate land-use and development of plantation.

2. Locate sources of greens.

3. Arrange with Board of Education and town officials for development.

4. Demonstrate proper tree planting, care, harvesting and sales.

5. Demonstrate wreath making and decorating.

STUDENT ACTIVITIES:

1. Plant, care for and harvest trees.

2. Make and decorate wreaths.

3. Sell trees and wreaths using accepted sales procedures.

EVALUATION:

1. Observation of students work habits.

2. Records of all sales by each student.

3. Records of all production by individual students.

4. Written evaluation made of students production, work habits and attitudes after conference.

5. Grade given on production and sales.

RESOURCES:

1. Equipment

   - A. truck
   - B. chain saw
   - C. bow saws
   - D. clippers
   - E. shears
   - F. wire
   - G. coat hangers
   - H. ribbon
   - I. cones
   - J. tags
   - K. order books
   - L. pencils

BIBLIOGRAPHY:

1. Dickson, A., Winch, F.E., *Shaping Christmas Trees for Quality*, Info. Bulletin #81, Extension Service, N.Y.S. College of Agriculture and Life Sciences, Cornell University, Ithaca, NY

2. Duda, E.J. & Savos, M.G., *Common Problems of Christmas Trees*, 66-5 Coop Extension Service, College of Ag., University of Conn., Storrs

3. Fox, R.T., *Christmas Decorations*, Information Bul. 134 Extension Service N.Y.S. College of Agriculture and Life Sciences, Cornell University, Ithaca, NY

4. Gambino, R.B., *How to Tie a Bow on Bow-Rite*, 4 Old Mill Road, New Milford, CT

5. Wyman, E.P., *Planting Forest Trees in Conn.*, 66-6 Coop Extension Service, College of Ag., University of Conn., Storrs, CT

6. *United States Standards for Grades of Christmas Trees*, U.S. Department of Agriculture, Agricultural Marketing Service, Washington, D.C.

MEDIA:

1. ______________________________

2. ______________________________

3. ______________________________

4. ______________________________

PLANT SCIENCE CURRICULUM

UNIT: Floral Design

LENGTH: 5 Weeks

WHEN TAUGHT: Grade 11 or 12, anytime of year.

OBJECTIVES: The student will be able to:

1. recognize the various elements and materials used in floral design.
2. use those elements to construct various floral arrangements.
3. figure costs of completed designs.

CONTENT:

- I. Principles of floral design
- II. Identification of containers, accessories and living materials used in construction
- III. Creating various arrangements
  - A. centerpieces
  - B. bouquets
  - C. baskets
  - D. sprays
  - E. corsages
  - F. holiday arrangements
- IV. Figuring costs
  - A. wholesale
  - B. retail
- V. Supplies
  - A. sources
    - 1. local
    - 2. mail order

TEACHER ACTIVITIES:

1. Use lecture periods to explain principles of design.
2. Demonstrate the construction of the various designs.
3. Arrange a field trip to a wholesale floral supplier.
4. Arrange a field trip to a local florist.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture and discussion sessions.

2. Choose materials for specific designs.

3. Create and explain various designs.

4. Figure costs of materials and retail price of various arrangements.

EVALUATION:

1. Review notebooks periodically.

2. Have students demonstrate design capability.

RESOURCES:

1. Local florist.

2. Local florist suppliers.

3. List of materials:

    A. containers
    B. tape
    C. wire
    D. oasis
    E. styrofoam
    F. pick
    G. scissors
    H. ribbons
    I. knives
    J. flowers and greens
    K. order forms
    L. cards and boxes

BIBLIOGRAPHY:

1. Clements, The David Hick Book of Flower Arranging, Von Nostrand Reinhold, 1976

2. March, Penney, Japanese Flower Arrangement, J. Kebana, Paul Hamlyn, 1969

3. Rockwell, The Complete Book of Flower Arrangement, Doubleday, 1947

4. Ullenbruch, Flower Arranging, Michigan State

MEDIA:

1. Basic Floral Design Kit, Filmstrip - VEP

2. Western Design, Filmstrip - VEP

3. Designing with Flowers and Decorative Materials, Slides - Cornell

4. Design Greens, Slides, Ohio

5. Cut Flowers, Slides, Ohio

6. Dried Materials, Slides - Ohio

7. Flower Arranging, Slides - Ohio

PLANT SCIENCE CURRICULUM

UNIT: Fruit Production

LENGTH: 5 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The student will be able to:

1. be familiar with practices involved in the production and marketing of fruit.
2. acquire knowledge necessary to produce quality fruit.

CONTENT:

- I. Site Selection
  - A. exposures
  - B. acreage
  - C. soils
- II. Small Fruits
  - A. strawberries
  - B. grapes
  - C. blueberries
  - D. brambles
- III. Tree Farms
  - A. apples
  - B. peaches
  - C. pears
  - D. plums
- IV. Planting & Care
  - A. pest control
  - B. pruning
  - C. harvesting
  - D. storage

TEACHER ACTIVITIES:

1. Arrange field trips to local orchards.
2. Prepare tools for pruning fruit treet.
3. Collect specimens for class identification.

STUDENT ACTIVITIES:

1. Maintain a notebook on lectures, discussions and field trips.
2. Prune fruit trees for production.
3. Prune small woody fruits for production.

EVALUATION:

1. Review student notebooks.
2. Evaluate plants pruned by students.
3. Give identification test.

RESOURCES:

1. Local orchards
2. Material
   - A. pruning tools

BIBLIOGRAPHY:

1. Childes, Modern Fruit Science, Interstate
2. Childes, Modern Fruit Science, Rutgers, 1978
3. Hill, Fruits & Berries for the Home Garden, Knoph, 1977

MEDIA:

1. Pruning Orchard Trees, Filmstrip, NASCO

PLANT SCIENCE CURRICULUM

UNIT: Greenhouse Crop Production & Marketing

LENGTH: 6 weeks

WHEN TAUGHT: Grade 11 or 12, anytime of the year

OBJECTIVES: The student will be able to:

1. develop competency in such practices as watering, fertilization, soil preparation and pest control.
2. understand the effects of photoperiods.
3. understand the grading, packing, and shipping of crops.
4. understand the market price tables.
5. understand the specific requirements of various greenhouse crops.
6. understand how to keep accurate records of crop treatments, success and value of various greenhouse crops.

CONTENT:

I. How cuttings are benched

II. Record keeping

III. Care of famished crop

IV. Grading and packaging flower crops

V. Identification of various crops

VI. Cultural requirements of various crops

VII. Wholesale and retail sales

VIII. Cost accounting

TEACHER ACTIVITIES:

1. Use lecture periods to explain the various crops and their requirements.
2. Arrange field trips to various wholesale and retail greenhouses.
3. Arrange purchase and delivery of various greenhouse crops and materials.

- E. gothic arch
- F. trox (commercial)
- G. panel houses
- H. air supported
- I. others

III. Special structures, construction, maintenance & use

- A. coldframes
- B. hotbeds
- C. lath house or slatted shed
- D. cloth house

IV. Factors to consider when locating a greenhouse or greenhouse range.

- A. access to a good road
- B. nearness to electricity and an adequate supply of clean water.
- C. greenhouse should be built on a deep, well-drained soil.
- D. good air and water drainage.
- E. do not build near trees or buildings as they will cause shade.
- F. do not build where limbs, stones, or other objects and debris that may be dislodged and cause damage
- G. be protected from strong winds and winter storms to help save fuel.
- H. locate close to market, and a source of reliable labor.
- I. a north-south orientation would be the best.

V. Parts of a greenhouse

VI. Greenhouse terminology

VII. Glazing materials and primary requirements

- A. glass
- B. plastic films
- C. polyethylene film
- D. vinyl film (PVC)
- E. mylar polyester film
- F. fiber glass

VIII. Heating systems

- A. steam
- B. hot water
- C. solar heat
- D. unit heaters
- E. forced air
- F. radiant heating
- G. electric

IX. Cooling systems

- A. fan and pad

   - B. mist system
   - C. shading compound

X. Ventilation

   - A. ridge
   - B. plastic tubes
   - C. fans
   - D. ridge ventilators and at the eaves (sash)

XI. Controlling light, temperature, humidity and CO_2 in the greenhouse

   - A. light controls
   - B. temperature controls
   - C. humidity controls
   - D. CO_2 control (Generator, liquid, dry ice, alchohol)
   - E. atmospheric control for refrigerator

XII. Greenhouse benches and beds

   - A. type of material used for the benches
   - B. bench arrangement and dimensions
   - C. advantages and disadvantages of using benches for growing plants

XIII. Additional special equipment in modern greenhouses

   - A. fertilizer injection equipment
   - B. automatic watering systems
   - C. misting systems
   - D. bottom bench heat provided by heating cables
   - E. temperature alarms
   - F. day-night time clocks

TEACHER ACTIVITIES:

1. Arrange class field trip to several greenhouse ranges to familiarize students with the greenhouse structures and equipment.

2. If possible develop a slide collection for classroom use as a follow-up at end of unit.

3. Provide laboratory demonstrations for the following: types of glazing materials, how to glaze a greenhouse, the parts to a greenhouse, and others.

4. Provide classroom time for lectures and individual study.

5. Divide class into various groups and have each group prepare a bill of materials and equipment for different types of greenhouse structures for class presentation.

STUDENT ACTIVITIES:

1. Maintain notebooks on lectures and discussions.
2. Complete all worksheets, drawings, quizes, outside readings or other assignments.
3. Repair and adjust any environmental control devices in the school greenhouse if possible and know how they are to operate. Make use of company manual.
4. Prepare a bill of materials for various greenhouse structures.
5. Prepare a list of equipment and costs for a greenhouse structure. (might use the school greenhouse layout)
6. Glaze a section of the greenhouse and/or cover a temporary greenhouse with plastic.
7. Demonstrate that they know how to provide proper ventilation for a greenhouse either by drawings or by use of a model. (it could be a class project by building one)
8. Demonstrate that they know the various kinds of glazing materials and where they are used.

EVALUATION:

1. Check all notebooks on a weekly basis.
2. Evaluate student quizes and tests. (pre-test & post-test)
3. Evaluate class project.
4. Evaluate the student's bill of materials and equipment analysis.
5. Evaluate each student's laboratory technique.
6. Evaluate the field trip follow-up.

RESOURCES:

1. Invite a resource person from a large operation in to discuss i.e. atmospheric controls.
2. Cooperative extension service for resource personnel and/or publications such as bulletins, leaflets or other media.
3. Connecticut Florist Association.

4. Lord And Burnham representative or other greenhouse manufacturer.

5. List of materials:

   A. samples of all kinds of glazing materials
   B. materials for glazing temporary greenhouse (plastic)
   C. materials for glazing school greenhouse or other.
   D. glazing tools.
   E. greenhouse catalogs from various manufacturers
   F. hand tools for repair or maintenance of equipment in greenhouse
   G. materials for building a coldframe, lathhouse or cloth house, if one is to be built
   H. plans for building

BIBLIOGRAPHY:

1. Clemmons, Jesse S., and others, Greenhouse Crop Production, Department of Agricultural Education, College of Agriculture, The Pennsylvania State University, University Park, Pennsylvania

2. Kiplinger, Laurie, Alex, D.D., and Nelson, Kennard, Commercial Flower Forcing, 7th edition, McGraw-Hill Book Company, New York, NY, 1968

3. Nelson, Kennard, S., Flower and Plant Production, The Interstate Printers and Publishers, Inc., Danville, Illinois, 1966

4. Pierce, John H., Greenhouse Grow How, Plants Alive Books, 5509 First Avenue South, Seattle, Washington 98108, 1977

5. Acme Engineering & Manufacturing Corp., Muskogee, Oklahoma

6. AgriBusiness Buildings & Equipment, Trans Sphere Corporation P.O. Box 1564, Mobile, Alabama, 38601

7. Ball Red Book, 13th edition, George J. Ball Company, 1975

8. Ickes-Brann Glasshouses, Main Office and Factory, 1733 N. Western Avenue, Chicago, Ill. 60647

9. Lord & Burnham, Irvington, New York 10533

10. Planning & Management of Greenhouses, IMS Cornell

11. Plaster Greenhouse Manual, IMS Cornell

12. Plastic Greenhouses, Extension Service, College of Agriculture, University of Illinois, Urbana, Illinois, Circular 905

13. Solar Greenhouses, Northeast Solar Energy Center, 70 Memorial Drive, Cambridge, Massachussetts 02142

14. Turner Greenhouses, P.O. Box 1260, HWY 117 South, Goldsboro, N.C. 27530

15. USDA Publications - give number and titles

MEDIA:

1. Greenhouses and Related Structures, Agdex 200/713, 1967, 62 colored slides and script. $9.50, Ohio Agricultural Education Curriculum Materials Service, Room 201, 2120 Fyffe Road, Columbus, Ohio 43210
2. Plastic Greenhouses - Planning, Construction & Use, #H1068, 80 color slides, Cornel, $20.00
3. Greenhouses - Uses & Designs, Self-explanatory, 40 frames, $4.25

PLANT SCIENCE CURRICULUM

UNIT: Interior Landscaping

LENGTH: 4 weeks

WHEN TAUGHT: Grade 11 or 12, anytime

OBJECTIVES: The student will be able to:

1. identify plants used in interior designs.
2. determine the light and temperature requirements of interior landscape plants.
3. recognize when an interior landscape plant requires water.
4. fertilize interior landscape plants using a proportioner.
5. select plants for a specific set of environmental conditions.
6. design an interior landscape.
7. determine rental, maintenance, and establishment costs for an interior landscape design.
8. identify sources of interior landscape materials.
9. establish an interior landscape.
10. maintain an interior landscape.

CONTENT:

I. Identification of interior landscape plants

II. Environment of interior landscape plants

    A. light
    B. temperature
    C. moisture
    D. fertility

III. Maintaining interior landscape plants

    A. watering
    B. fertility
    C. controlling pests and diseases

IV. Designing an interior landscape

    A. determining light levels
    B. selecting plants for existing environmental conditions
    C. selecting plants for function

D. selecting plants for beauty

V. Developing cost estimates

A. rental contract
B. maintenance contract
C. establishment contract

VI. Establishing interior landscapes

A. providing adequate light
B. providing drainage
C. selecting a soil mix
D. acclimatizing interior landscape plants
E. placing plants in the landscape

TEACHER ACTIVITIES:

1. Provide plant material, illustrations, and slides of interior landscape plants for the students.

2. Demonstrate techniques of watering and fertilizing interior landscape plants.

3. Demonstrate methods of determining existing light levels.

4. Provide finished interior landscape plans for the students to study.

5. Provide trade journals which contain sources and prices of plant material.

6. Invite an interior landscaper to talk to the class.

7. Conduct field trips to shopping malls and other public places which contain interior landscapes.

8. Conduct field trips to interior landscape plant growers and wholesalers.

STUDENT ACTIVITIES:

1. Develop a card file containing environmental requirements, growth habits, and uses of interior landscape plants.

2. Determine existing light levels.

3. Water and fertilize plants growing in an interior landscape.

4. Design an interior landscape, taking into consideration the existing light levels and function of the landscape.

5. Develop an establishment contract, rental contract, and maintenance contract for an interior landscape.

6. Establish an interior landscape borrowing plant material from a wholesaler if necessary.

EVALUATION:

1. Grade card file.
2. Rate ability to water landscape plants.
3. Rate ability to mix fertilizer and apply it to interior landscape plants.
4. Grade interior landscape design.
5. Grade establishment, rental, and maintenance contracts.
6. Rate ability to establish an interior landscape.

RESOURCES:

1. Trade journals.
2. Wholesalers and growers of interior landscape plants.
3. Shopping malls, banks, etc. which contain interior landscapes.
4. Interior landscapers.

BIBLIOGRAPHY:

1. Gaines, Richard L., Interior Plantscaping, Architectural Record Books, New York, 1977
2. House Plant and Interior Design, Countryside Books

MEDIA:

1. ____________________
2. ____________________
3. ____________________
4. ____________________

PLANT SCIENCE CURRICULUM

UNIT: Landscape Construction

LENGTH: 4 - 6 weeks

WHEN TAUGHT: Grade 11 or 12, Fall or Spring

OBJECTIVES: The student will be able to:

1. become familiar with various elements used in the landscape.
2. become familiar with the various construction materials used in the landscape.
3. become familiar with estimating cose of material, supplies and labor.
4. become familiar with plants used in the various parts of the landscape.

CONTENT:

I. Identifying landscape needs of family

II. Analyzing the site

III. Drawing of a landscape plan

IV. Selection of various landscape elements

  A. fences
  B. walls
  C. retaining walls
  D. patios
  E. decks
  F. outdoor fireplaces

V. Selection of construction material

  A. wood
  B. brick
  C. patio block
  D. cinder block
  E. railroad ties
  F. rock walls
  G. mulches
  H. other

VI. Preparing the site

  A. slope
  B. drainage
  C. fitting plants to the design

  - D. water
  - E. light
  - F. soil requirements

VII. Selection of plant material

  - A. simplicity
  - B. form
  - C. texture
  - D. contrast
  - E. scale
  - F. repetition
  - G. plant hardiness

VIII. Estimating costs

  - A. material
  - B. supplies
  - C. labor

TEACHER ACTIVITIES:

1. Use lecture periods to identify landscape needs of the family.

2. Take field trips to compare various elements used in the landscape.

3. Use lecture periods to estimate costs of material, supplies and labor.

4. Use both lecture time and arrange for field trips to demonstrate use of plants in the landscape.

5. Use both lecture time and arrange for field trips to demonstrate use of construction material in the landscape.

STUDENT ACTIVITIES:

1. Maintain a notebook.

2. Identify landscape needs of family.

3. Select various elements for their landscape plan.

4. Estimate cost of material, supplies and labor of his landscape plan.

EVALUATION:

1. Review notebook periodically.

2. Have student demonstrate a landscape plan.

3. Have students critique sites visited.

RESOURCES:

1. Local family house.
2. Drafting material.

BIBLIOGRAPHY:

1. Evans, *Lessons in Estimating Landscape Costs*, IMS Cornell, 1979
2. Giles, *Landscape Construction*, University of Illinois, 1976
3. Hannebaum, *Landscape Operation - Management, Methods and Materials*, Reston, 1980
4. Nelson Jr., W.M.R., *Landscaping Your Home*
5. Smith, *Patios, Terraces, Decks and Roof Gardens*, Beckman House. 1969

MEDIA:

1. Landscape Construction Series - 7 Slide Sets, NASCO
2. Landscape Construction Accessories - Slides, Illinois
3. Plans, Planting, Bed Preparation - Slides, Illinois
4. Walks, Steps & Retaining Walls - Slides, Illinois
5. Structure Seating, Play Areas - Slides, Illinois

PLANT SCIENCE CURRICULUM

UNIT: Landscape Design

LENGTH: 4 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The students will be able to:

1. have a functional understanding of the concepts listed under vocabulary.
2. read a basic landscape plan.
3. construct scale model landscapes with foundation plants, patio, screen and garden areas.
4. identify plants according to:
   - A. function (i.e., ground cover, screening)
   - B. height and shape
   - C. growth season (leaf, flowering and berries)
   - D. soil and light needs
5. name 4-6 plants for specific landscape needs (i.e., foundation planting, screening, shady ground cover, boarders, flower bed).
6. determine landscape construction cost and identify sources of landscape materials.

CONTENT:

I. Purpose of Landscape Construction

II. Reading Landscape Designs

III. Construct Scale Model Landscape Designs

IV. Identify plants according to function, height, shape, growth season, soil, and light needs

V. Recognize each plant's use in landscape

VI. Determining landscape construction cost and identifying sources of landscape material

TEACHER ACTIVITIES:

1. Arrange field trips to suitable landscape sites.
2. Critique established plantings for students.
3. Provide samples and materials to draw a landscape plan.

STUDENT ACTIVITIES:

1. Visit landscape sites.
2. Plot shape of landscape areas.
3. Record plants used in shady and sunny areas.
4. Record plants used as ground cover, screen.
5. Record specimen plants.
6. Note plant textures.
7. Study landscape designs for focal point, balance, symmetry.

EVALUATION:

1. Check student notebooks and records from site visits.
2. Have students correct flaws, i.e., poor balances, plants in unsuitable light, plants placed incorrectly for function.
3. Vocabulary and concepts defining.
4. Identification of plants by names, function and growth requirements.

RESOURCES:

1. Slides - both professional and personal.
2. Buildings and private homes as sites to visit.
3. Local nurseries and landscape contractors.

BIBLIOGRAPHY:

1. Hudak, Approaches to Home Landscape Design, American Nurserymen, 1974
2. Ingels, Landscaping: Principles & Practices, Delmar, 1978
3. Margraff, Landscape Drawing Techniques, IMS Cornell, 1979
4. Robinette, Off the Board - Into the Ground, Kendall-Hunt, 1968
5. Landscape Design, Pennsylvania State University, 1968

MEDIA:

1. Landscaping Do's & Dont's - Filmstrip, NASCO
2. Ornamental Plants for International Landscaping, IMS Cornell
3. Landscape Design - Ohio - Slides

PLANT SCIENCE CURRICULUM

UNIT: Landscape Maintenance

LENGTH: 4 weeks

WHEN TAUGHT: Grade 11 or 12, Spring or Fall

OBJECTIVES: The student will be able to:

1. prune shrubbery and trees.
2. fertilize landscape plantings.
3. mulch and water landscape plants.
4. control weeds, insects, and diseases of landscape plants.
5. maintain lawns.

CONTENT:

I. Pruning
    A. injured plants
    B. rejuvenation
    C. developing form
    D. maintaining formal hedges
    E. pruning shade trees

II. Fertilizing landscape plants
    A. trees and shrubs
    B. ground covers and vines
    C. turf areas

III. Mulching landscape plants

IV. Watering landscape plants

V. Weed control

VI. Insect and disease control

VII. Turf Maintenance
    A. mowing
    B. watering
    C. fertilizing

TEACHER ACTIVITIES:

1. Demonstrate the proper methods of pruning.
2. Provide fertilizer schedules for landscape plants.
3. Demonstrate the proper methods of fertilizing landscape plants.

4. Provide samples of weeds, and insect and disease damage.
5. Discuss proper turf maintenance.

STUDENT ACTIVITIES:

1. Prune trees, shrubs and hedges.
2. Mulch landscape plants on school grounds.
3. Select and apply chemicals for weed, insect, and disease control.
4. Operate lawn mowers and lawn fertilizer spreaders.
5. Determine the amount of fertilizer needed for a turf area.
6. Maintain a portion of the school grounds.
7. Take field trips to observe professional landscape practice.

EVALUATION:

1. Rate pruning technique on assigned trees and shrubs.
2. Evaluate ability to select and apply mulch to landscape plants.
3. Evaluate ability to select and apply pesticides.
4. Evaluate ability to select and apply fertilizer to a lawn area.

RESOURCES:

1. Extension bulletins.

BIBLIOGRAPHY:

1. Evans, Lessons in Estimating Landscape Costs, IMS Cornell, 1979
2. Hannabaum, Landscape Operations - Management, Methods & Materials, Reston, 1980
3. Hill, Pruning Simplified
4. Ingels, Landscaping: Principle and Practice
5. Penn St. Univ., Landscape Maintenance and Establishment
6. Wilson, Landscape Maintenance, VEP, 1969
7. Business Principles of Landscape Service, Ohio State

MEDIA:

1. ________________________________

PLANT SCIENCE CURRICULUM

UNIT: Nursery Management

LENGTH: 6 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The student will be able to:

1. understand the factors used in the selection of a nursery site.
2. understanding why facilities and equipment are needed for the production of nursery plants.
3. understand how to propogate nursery stock by grafting, budding, cuttings and seeds.
4. understand pruning methods for nursery stock, also root pruning.
5. understand how to fertilize nursery stock properly.
6. understand how to control weeds in the nursery.
7. understand how to recognize and control insects and diseases in the nursery.
8. understand cultural practices for some of the most common plants in the nursery.
9. understand the importance of and the reason for using the botanical names for nursery-grown stock.

CONTENT:

I. Criteria for selecting a site
    A. climatic zone
    B. topography
    C. type of soil
    D. water supply
    E. marketing area
    F. relative costs of operation in another location
    G. air pollutants

II. Plant identification
    A. ornamental trees
    B. shrubs
    C. ground covers
    D. vines
    E. botanical names

III. Layout and arrangement for container production

A. plants to be grown
B. irrigation system
C. cultural requirements
D. space requirements
E. structures to be used or needed
F. handling of materials for efficiency
G. supplies

IV. Field Grown Plants

A. kinds of plant to be grown
B. amount of space needed
C. watering system
D. structures needed
E. handling of materials for efficiency
F. cultural requirements
G. crop rotations
H. winter protection
I. digging B & B and bare-root
J. holding plants for short periods of time

V. Managing nursery soils

A. soil test
B. soil preparation
C. control erosion
D. fertilizing
E. proper tillage
F. soil sterilizing
G. control of proper moisture

VI. Propagation of nursery stock

A. facilities and equipment
B. methods of propagation
C. propagation methods for specific plants
D. plant materials and supplies needed
E. humidity, temperature, light and shade requirements

TEACHER ACTIVITIES:

1. Arrange class trip to a large commercial nursery to observe layout of the physical plant. (If possible) container production.

2. Arrange class trip to local nursery for plant identification.

3. Arrange class trip to a large commercial nursery to observe propagators performing the various methods of propogation.

4. If the school does not already have a nursery, the teacher should make every effort to establish one for the good of the department, the school, and the community.

5. Arrange for local nurserymen to come to the Vocational Agricultural Department to discuss with the class container grown stock, field grown stock, propogation methods, career opportunities, or any other subject pertinent to the class at any particular time.

6. Provide propogating bench in green house.

7. Provide lecture time in the classroom to discuss various principles and operations.

8. Conduct demonstrations where applicable for the different operations.

STUDENT ACTIVITIES:

1. Maintain a notebook on all class lectures and discussions.

2. Learn how to propogate different types of nursery stock growing in the school nursery or the community.

3. Sow seed properly in the greenhouse.

4. Do a T bud on roses.

5. Take various cuttings from shrubs and other ornamentals in the school nursery or from the school grounds and propogate them.

6. Collect samples of diseases and insects of ornamentals and and correctly identify and how controlled.

7. Dig bare-root and B & B stock, grade them and label for identification.

8. Plant a container crop in the school nursery.

EVALUATION:

1. Provide students with a short pre-test at the beginning of the Nursery Management Unit.

2. Students will maintain notebooks during any and all classroom lectures and discussions.

3. Students' response to classroom discussion.

4. Quizes to be provided at various intervals to include classroom work and laboratory experiences.

5. Students' ability to work to capacity during the laboratory period.

6. Post-test to be given at the end of the Nursery Management Unit.
7. Each student to be graded at the end of each laboratory exercise.

RESOURCES:

1. Contact local extension office for publications relating to the Nursery Management Unit.
2. Contact local area nurserymen to make a presentation on any subject area of concern to you.
3. Land Laboratory (School)

BIBLIOGRAPHY:

1. Berninger, Profitable Garden Center Management, Reston, 1978
2. Hartman, H.T. & Kester, D.E., Plant Propogation Principles, Prentice-Hall, Inc., Englewood Cliff, NJ, 1968
3. Patterson, Poinsettia Growing, American Nurserymen,1969
4. Pinney, John J., Beginning in the Nursery Business, American Nurseryman Pub. Co., Chicago, IL, 1967
5. Robinson, William A, and others, Nursery Production and Landscape Maintenance, Department of Agricultureal Education, College of Agriculture, The Pennsylvania State University, University Park, Penn.
6. Stinson, Nursery Production, Penn. State 1971
7. Stinson, The Nursery Worker, Ohio State, 1973

MEDIA:

1. Container Production of Nursery Hort., Filmstrip, NASCO
2. Propogation of Deciduous Shrubs for Nursery Production, NASCO, Filmstrip
3. Selecting Container Evergreens, 3 Filmstrips, NASCO

PLANT SCIENCE CURRICULUM

UNIT: Operation and Care of Horticultural Equipment

LENGTH: 6 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: Student will be able to:

1. understand the basics of the equipment.
2. use safe operating procedures.
3. perform maintenance practices.

CONTENT:

I. Safety
   A. safety labels on machines
   B. operating machinery speeds
   C. handling equipment
   D. refueling
   E. changing the oil

II. Fuel
   A. storage containers
   B. storage location
   C. grade

III. Operator's Manual
   A. read the instructions
   B. follow step-by-step procedures
   C. controls and instruments
   D. operation
      1. break-in procedures
      2. starting the engine or equipment
      3. stopping the engine or equipment
      4. operating function of various parts
   E. lubrication
      1. lubrication and maintenance chart
      2. fuels and lubricants
      3. service procedure
      4. general maintenance
   F. air cleaners
      1. cleaning procedures
      2. length of time between service

G. electrical

    1. spark plug servicing
    2. care and maintenance of ignition systems
    3. battery maintenance

H. cooling system
I. carburetion

TEACHER ACTIVITIES:

1. Demonstrate safe operating procedures.

2. Demonstrate servicing and maintenance.

3. Demonstrate various adjustments to be made on equipment.

    A. measuring devices
    B. seeding
    C. fertilizer

STUDENT ACTIVITIES:

1. Maintain a notebook.

2. Use an operator's manual.

3. Perform maintenance functions.

4. Operate equipment

EVALUATION:

1. Review notebook periodically.

2. Test or quiz frequently.

3. Observe actual maintenance and service.

4. Observe actual operation, safety and skills.

RESOURCES:

1. Machinery dealers and their equipment

2. School owned equipment

3. Students' and parents' equipment

4. Farmers in the area

BIBLIOGRAPHY:

1. Briggs and Stratton Repair Instruction IV, Milwaukee, Wisconsin, Briggs and Stratton Corp.
2. General Theories of Operation, Milwaukee, Wisconsin, Briggs and Stratton Corp.
3. Briggs and Stratton Parts Manual, Milwaukee, Wisconsin, Briggs and Stratton Corp.
4. Tecumseh Parts Manual, Lauson, Tecumseh Corporation, Grafton, Wisconsin
5. Mechanics Handbook, Lauson, Tecumseh Corporation, Grafton, Wisconsin
6. Gray, James A., and Barrows, Richard, Small Gas Engines, Prentice-Hall, Englewood, N.J., 1976
7. Manuals from various manufacturers.

MEDIA:

1. Using Power Lawn Mowers Safely - 78 Frames, Color IL, $9.50
2. Using Power Mower Safely, 40 Masters, Corness, $2.00
3. Troubleshooting Small Gas Engines of Lawn Mowers, 21 Masters, Cornell, $1.25

PLANT SCIENCE CURRICULUM

UNIT: Perennial Plant Production & Marketing

LENGTH: As the situation dictates.

WHEN TAUGHT: Grade 11 or 12, Spring or Fall

OBJECTIVES: The Student will be able to:

1. identify perennials.
2. establish a perennial border.
3. describe cultural practices of selected perennials.
4. grow perennials for seed.
5. plan a schedule for sowing perennial seed at the proper time of year.
6. describe the proper means of protecting plants over the winter.
7. start perennials using asexual propagation.
8. determine proper marketing procedures.

CONTENT:

I. Plant life-cycles

II. Perennial border establishment and maintenance

    A. preparation of soil
    B. planting
    C. nutrition
    D. cultivation
    E. watering
    F. staking
    G. protection

III. Perennial garden design

    A. color
    B. height
    C. time of bloom
    D. texture

IV. Propagation

    A. seed

        1. time of year
        2. coldframes
        3. greenhouse

- B. cuttings
- C. division

V. Growing in containers

- A. transplanting
- B. watering
- C. growing medium
- D. fertility
- E. pest control
- F. winter protection

VI. Marketing

- A. advertising
  1. highway signs
  2. newspaper ads
  3. radio and TV
  4. open house
  5. direct mail
- B. display
  1. organizing sales area for self service
  2. labelling
  3. cultural information
- C. record keeping
  1. variatal popularity
  2. inventory on hand
  3. cost of materials
  4. maintenance
- D. wholesale and retail

TEACHER ACTIVITIES:

1. Provide pictures and slides of various perennials.
2. Conduct fieldtrip to local bedding plant grower.
3. Provide students with examples of perennial garden design.
4. Demonstrate techniques of propagating perennials.

STUDENT ACTIVITIES:

1. Collect pictures from catalogs and prepare 5x8 cards with pictures and cultural information.
2. Maintain school perennial garden.

3. Germinate perennials from seed.
4. Make a coldframe.

EVALUATION:

1. Evaluate 5x8 card collected by students.
2. Identification quizes.

BIBLIOGRAPHY:

1. Cumming & Lee, Contemporary Perennial, McMillian, 1960
2. Giles, Herbaceous Perennial, Reston, 1980
3. Hottes, The Book of Perennials
4. Hudah, Gardening With Perennials, Deteter Press, 1976
5. Nehrling, The Picture Book of Perennials
6. Nelson, W.R., Landscaping Your Home
7. Williams, G.S., Greenhouse Flowers and Bedding Plants

MEDIA:

1. Perennial Plants of Garden Design - Cornell Slides
2. I.D. & Characteristics of Selected Biennial, Perennial, and Bulbs - Slides - Cornell
3. Perennial - Slides - Ohio, 1977

PLANT SCIENCE CURRICULUM

UNIT: Plant Anatomy and Function

LENGTH: 4 - 6 Weeks

WHEN TAUGHT: Grade 11 or 12, anytime of year.

OBJECTIVES: The student will be able to:

1. develop the scientific knowledge and the practical application of plant parts, their function, and plant processes.

CONTENT:

I. Introduction
   - A. reasons for knowing anatomy and functions
   - B. application for the horticulturalist

II. Plant parts
   - A. stems
   - B. roots
   - C. leaves
   - D. modifications (e.g. flowers, fruit, seed)

III. Plant processes
   - A. photosynthesis
   - B. respiration
   - C. transpiration

IV. The microscope
   - A. dissecting
   - B. compound

TEACHER ACTIVITIES:

1. Use lecture periods to explain the various parts of plants and the functions that occur within those parts.

2. Collect plant material for class study.

STUDENT ACTIVITIES:

1. Examine various plant parts by eye and with the microscope.

2. Draw and label various plant structures.

3. Study plant reactions to various environmental changes.

EVALUATION:

1. Review student notebooks and drawings.

2. Have student demonstrate microscope use.
3. Have student demonstrate results of environmental changes on plant structure or function.

RESOURCES:

1. Greenhouse or native plant material.
2. Dissecting and compound microscope.
3. Slides, cover slips, dissecting kits.

BIBLIOGRAPHY:

1. Baurdendistel, Horticulture: A Basic Awareness, Reston, 1979
2. Hemp, Ornamental Horticulture Source Units, Interstate
3. Reiley, Introductory Horticulture, Van Notranal Reinhold, 1979

MEDIA:

1. Life of the Green Plant, Slides- NASCO
2. Plant Life, Filmstrip - NASCO
3. Flower, Fruits & Seeds, Slides - NASCO

PLANT SCIENCE CURRICULUM

UNIT: Plant Nutrition

LENGTH: 4 to 6 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The student will be able to:

1. understand that soil factors influence plant growth and management is essential for optimun growth and yield.
2. understand that physical and chemical properties of soils will determine the crops grown and the management techniques.
3. test greenhouse and field soils accurately.
4. interpret soil tests results.
5. accurately apply fertilizer materials.

CONTENT:

I. Soil Science and Plant Growth
  - A. soil factors influencing plant growth
  - B. soil fertility and native vegetation
  - C. essential plant food elements (plant nutrients)
  - D. roles of the major and trace plant nutrients

II. Physical Properties of Soils
  - A. mechanical analysis
  - B. soil texture
  - C. soil structure
  - D. porosity and granulation

III. Soil Formation and Classification
  - A. classification of parent materials
  - B. materials transported by wind, water, ice, gravity
  - C. disintegration and decomposition of soils
  - D. soil maps and surveys

IV. Chemical and Colloidal Properties of Soil
  - A. colloidal clay
  - B. humus
  - C. cation exchange
  - D. soil pH
  - E. buffering
  - F. fixation of elements

V. Life in the Soil

A. fungi and bacteria
B. nitrification
C. plant roots
D. soil

VI. Organic Matter

A. functions of organic matter
B. chemical and biological properties of organic matter
C. maintaining organic matter in the soil

VII. Soil Water

A. infiltration
B. permeability
C. soil water classified
D. percolation
E. leaching losses of nutrients

VIII. Fertilization

A. uptake of nutrients
B. fertilizers and their characterization
C. use of fertilizers
D. lime and liming practices

IX. Related Topics to be Covered in Soils Unit

A. tillage
B. soil conservation
C. irrigation
D. drainage
E. manure, compost, ecology

TEACHER ACTIVITIES:

1. Use lecture periods to explain the soil factors that influence plant growth.

2. Demonstrate the procedures for taking soil samples and testing nutrient levels of greenhouses and field crops.

3. Plan a field trip to study soil formation and classification.

4. Prepare greenhouse laboratory projects on plant nutrition, i.e. essential elements for plant growth and their symptoms of deficiency.

5. Use lecture periods to discuss the use of synthetic and organic fertilizers and demonstrate the methods of application.

STUDENT ACTIVITIES:

1. Maintain a notebook on lecture and discussion sessions.
2. Answer study questions to be presented after each lecture.
3. Take soil samples.
4. Test their own field of garden soil for N.P.K., pH
5. Make interpretations from their own tests.
6. In groups of two, carry on a six-week nutrient experiment in the school greenhouse which will demonstrate nutrient deficiencies.

EVALUATION:

1. Review notebooks periodically.
2. Evaluate student learning with quizes.
3. Have student demonstrate laboratory techniques.
4. Evaluate recommendations of students after testing own soils.
5. Check results of project at end of unit with a post-test.

RESOURCES:

1. Contact your local extension office for publications relating to units in the soils area.
2. Invite the area soil conservationist to give a short talk and guided field trip.
3. List of materials:

    A. spurway soil testing kit
    B. pH meter
    C. solu-bridge meter
    D. kelway meter
    E. pails and shovels
    F. ingredients for synthetic soil media
    G. liquid and dry fertilizers
    H. "hozon" and gallon container
    I. lab on nutrient deficiencies (write to Jay Koths, University of Connecticut)
    J. samples of different soil types
    K. visuals, slides of nutrient deficiencies, soil profiles, etc.
    L. sampling tube and auger

BIBLIOGRAPHY:

1. Donahue, Roy L., Soils, Prentice Hall, Inc.
2. Foster, A.B., Approved Practices in Soil Conservation
3. Jons, Fertilizer & Soil Fertility, Reston Pub., 1979
4. McVichar, Using Commercial Fertilizer, Interstate, 1978
5. Sprague, Hunger Signs in Crops, McKay Co., 1951
6. Spurway, C.H., Simplex Soil Testing Outfit, NASCO
7. Tisdale, Nelson, Soil Fertility & Fertilizers, McMillan, 1964
8. Wallace, Mineral Deficiencies in Plants, Chemical Pub. Co., 1961

MEDIA:

1. Fertilizing Ornamental Plants, Filmstirp, VEP
2. Nutrient Deficiency, Poinsettias, Slides
3. Nutrient Deficiency, Tomatoes, Slides

PLANT SCIENCE CURRICULUM

UNIT: Plant Propagation

LENGTH: 3 weeks

WHEN TAUGHT: Grade 11 or 12

OBJECTIVES: The student will be able to:

1. develop the skills necessary to propagate plants properly.
2. understand the plant's formation of a new root system.

CONTENT:

- I. Sexual
  - A. structure and function of seeds
  - B. production of seeds
  - C. storage of seeds
  - D. germination of seeds
- II. Asexual
  - A. importance of cuttings
  - B. types of cuttings
    - 1. leaf
    - 2. root
    - 3. stem
  - C. factors affecting success in making and rooting cuttings
  - D. procedures in making cuttings
  - E. care of rooted cuttings
  - F. grafting
  - G. layering
- III. Propogation structures

TEACHER ACTIVITIES:

1. Arrange a field trip to a propagation house.

STUDENT ACTIVITIES:

1. Choose correct medias for different forms of propagation.
2. Make cuttings correctly.
3. Store rooted cuttings.
4. Make different types of grafts.
5. Perform air layerage.
6. Prepare seeds for storage and germination.

EVALUATION:

1. Multiple choice and short answer exam on factual knowledge.
2. Observation of techniques used in cuttings, grafting, budding, and layering.
3. Percent of takes on various asexual techniques.

RESOURCES:

1. Plant Propogation in Pictures
2. Seeds Manual - Parki Seeds

BIBLIOGRAPHY:

1. Evans, New Plants From Old, Random House, 1976
2. Malstead, Plant Propagation
3. Nelson, Plant and Flower Production in the Greenhouse

MEDIA:

1. Propagating Ornamental Plants - Filmstrip, NASCO
2. Propagation by Air Layering - Slides, NASCO
3. Types of Grafting - Slide set, NASCO
4. Budding & Grafting - Filmstrip, NASCO

PLANT SCIENCE CURRICULUM

UNIT: Retail Flower Shop Management

LENGTH: 4 - 6 Weeks

WHEN TAUGHT: Grade 11 or 12, anytime of year.

OBJECTIVES: The student will be able to:

1. work at a retail florist shop.
2. understand what is involved in the stocking, displaying, advertising and selling of retail florist supplies and creations.

CONTENT:

I. Employment opportunities

II. Merchanising and selling flowers and floral materials

III. Suppliers

IV. Shop layout

V. Management

VI. Accounting, bookkeeping and records

TEACHER ACTIVITIES:

1. Use lecture periods to explain the retail florist business.
2. Arrange field trips to retail and wholesale florists.

STUDENT ACTIVITIES:

1. Maintain a notebook of lecture and discussion sessions.
2. Draw the layout for a retail florist shop.
3. Make a display ad.
4. Figure wholesale and retail costs of various florist shop services.
5. Ask questions on field trips.

EVALUATION:

1. Review notebooks periodically.
2. Have students explain their shop layout drawing.
3. Have student critique shops visited.

RESOURCES:

1. Contact wholesale and retail florist suppliers and shops.

BIBLIOGRAPHY:

1. Garding, Retail Floristry, Univ. of Texas, 1976
2. Pfahl, Retail Florist Business, Interstate, 1977
3. Retail Flower Shop Operator & Management, Penn State, 1968

MEDIA:

1. Care & Handling of Cut Flowers & Foliage, Filmstrip - VEP

PLANT SCIENCE CURRICULUM

UNIT: Turf Management

LENGTH: 5 Weeks

WHEN TAUGHT: Grade 11 or 12, Fall or Spring

OBJECTIVES: The student will be able to:

1. explore employment opportunities in turfgrass occupations.
2. identify the turfgrasses used in Connecticut.
3. maintain proper soil fertility for turf areas.
4. learn mowing and watering practices.
5. identify and control pests of lawns.
6. plan and establish a new turfgrass area.

CONTENT:

I. Exploring employment opportunities
   - A. specific job classification
   - B. outlook, nature of work, and qualifications needed

II. Identify turfgrasses
   - A. parts of grass plant
   - B. growth habits and cultural requirements

III. Soil fertility
   - A. soil sampling and understanding soil tests
   - B. lime requirements
   - C. fertilizer recommendations per use, variety, etc.
   - D. applying lime and fertilizer

IV. Mowing and watering
   - A. mowing height, frequency, and practices
   - B. thatch control and aeration
   - C. amount and frequency, time and rate of watering
   - D. different watering equipment

V. Turf pests
   - A. identification of weeds
   - B. control of weeds using chemicals
   - C. disease identification, causes, and control
   - D. insect control and identification
   - E. types of equipment used to control pests

VI. Establishing turfgrass

A. time of planting
B. seedbed preparation
C. grass seed mixtures
D. lime, fertilizer, seed, mulch, etc. amounts and types
E. methods of preparation, and cost estimating

TEACHER ACTIVITIES:

1. Show slides to acquaint students with turf jobs.
2. Plan a field trip to turf farm or golf course.
3. Provide turf plants for identification, and use slides.
4. Demonstrate soil sampling procedures, and discuss the recommendations.
5. Demonstrate lime and fertilizer handling and application.
6. Discuss and demonstrate mowing, watering, and thatch removal equipment.
7. Provide examples of weeds, insects, and disease damage.
8. Demonstrate weed, insect, and disease control practices.
9. Develop a turf establishment contract for students to practice steps in turfgrass establishment.

STUDENT ACTIVITIES:

1. View slides on turf occupations.
2. Take field trip to turf operation, such as golf course.
3. Study slides on turf grass identification.
4. Prepare mounts of different turf grass species.
5. Plant a flat of a turf grass species or variety.
6. Take soil samples of turf area, fill out information sheet, and analyze results of test.
7. Apply lime and fertilizer to turf area.
8. Operate different lawn mowers, and thatch removal equipment.
9. Determine water distribution pattern of different watering devices.
10. Preserve specimens of weeds, insects, and diseases of turf for study and display.

11. Operate turf sprayer equipment at local golf course or on school grounds.

12. Write up a turf establishment contract detailing date of planting, methods to use, amounts of materials, estimate time and cost to complete.

13. Set up a turf test plot at least 50 feet by 50 feet to observe seed mixtures, seeding rates, and fertilizer amounts.

EVALUATION:

1. Turf grass identification quiz.
2. Test ability to calculate, select, and apply lime, fertilizer, seeds, etc.
3. Score section of the turf test plot.
4. Write turf contract for turf establishment.

RESOURCES:

1. Local Golf Course
2. Local Tree Farm
3. Seed Samples
4. Trial Plots
5. Turf equipment - lawnmower
6. Local small engine service shop

BIBLIOGRAPHY:

1. Sprague, Turf Management Handbook, Interstate, 1976
2. Turgeon, Turfgrass Management, Reston, 1980
3. Greenskeeping, Penn. State, 1980
4. Turfgrass Maintenance, Establishment, Penn State, 1980

MEDIA:

1. Lawn & Ground Care, Filmstrip - VEP
2. Lawn Care & Management, Slides - Ohio
3. Lawn Renovation & Reestablishment, Slides - Ohio

PLANT SCIENCE CURRICULUM

UNIT: Vegetable Production & Marketing

LENGTH: 5 weeks

WHEN TAUGHT: Grade 11 or 12, Spring

OBJECTIVES: The student will be able to:

1. be acquainted with the practices involved in the production of vegetables.

CONTENT:

I. Vegetable Industry

   A. scope
   B. production areas - local, regional, national

II. Classification of vegetables

   A. botanical families
   B. warm & cool season crops

III. Seeds & Seed Sowing

   A. buying seed
   B. sowing seeds

IV. Site Selection

   A. preparing soils
   B. pH
   C. maintaining organic matter
   D. using commercial fertilizers
   E. determining fertilizer requirements
   F. soil testing

V. Growing plants, gardening and transplanting

   A. structure for growing plants
   B. transplanting
   C. hardening of transplants

VI. Field Planting

VII. Cultivation and Rotating

   A. weed control

      1. manual
      2. chemical

   B. rotation of crops
   C. conservation practices

VIII. Irrigating and Mulching

IX. Controlling Insects and Diseases

- A. insecticides
- B. fungicides
- C. safety in handling insecticides and fungicides

X. Marketing

- A. quality
- B. harvesting
- C. preparation for market
- D. equipment for harvesting and handling
- E. storage

XI. Identification of:

- A. asparagus
- B. beans
- C. cabbage
- D. celery
- E. corn
- F. cucumbers
- G. eggplants
- H. lettuce
- I. muskmelon
- J. onions
- K. peas
- L. peppers
- M. potatoes
- N. beets
- O. carrots
- P. parsnips
- Q. turnip
- R. rutabaga
- S. radish
- T. spinach
- U. squash
- V. sweet potato
- W. tomato
- X. watermelon

XII. For each, know the following:

- A. selecting varieties
- B. fertilization
- C. pH
- D. planting
- E. soil requirements
- F. controlling insects & diseases
- G. harvesting
- H. handling
- I. marketing

TEACHER ACTIVITIES:

1. Prepare study guides - questions.
2. Arrange field trips.

STUDENT ACTIVITIES:

1. Read text & bulletins.
2. Complete work sheets, slides.

EVALUATION:

1. Quizes
2. On farm/at home visits

RESOURCES:

1. Local nursery
2. Local farms
3. School greenhouse & land lab

BIBLIOGRAPHY:

1. Cruso, Making Vegetables Grow, Knopf, 1975
2. Doty, All About Vegetables, Ortho, 1973
3. McCullom, Producing Vegetable Crops, Interstate, 1980
4. Ware & McCullom, Raising Vegetables
5. Gardening for Food & Fun, Yearbook of Agriculture, 1977

MEDIA:

1. Vegetable Gardening, Filmstrip - Photocom

PLANT SCIENCE CURRICULUM

UNIT: Beekeeping

LENGTH: 6 weeks

WHEN TAUGHT: Grades 11-12

OBJECTIVES: The student will be able to:

1. identify bees.
2. identify and use beekeeping equipment.
3. start a hive.
4. know how and when to feed a hive.
5. remove honey from a hive.
6. be able to identify and treat foul brood.
7. extract honey.
8. prepare a hive for winter.

CONTENT:

I. Set up a hive from a kit
   A. build supers
   B. build frames
   C. add foundations

II. Bee Safety
   A. demonstrate and explain proper use of all protective clothing and smoker

III. Starting a hive
   A. purchase or buy a swam
   B. disease prevention
   C. feeding

IV. Honey Production
   A. remove honey from a hive
   B. extract honey
   C. bottle and sell product

TEACHER ACTIVITIES:

1. Purchase starter hive, protective clothing and extractor.
2. Check with area beekeepers about possible field trips. (In Conn., beekeepers register their hives with the town

(clerk at a cost of 25¢ per hive. They are then inspected annually by the state)

STUDENT ACTIVITIES:

1. Compile a list of beekeepers in the area.
2. Construct a hive.
3. Install foundations in frames.
4. Work with bees where possible.
5. Read assigned reading.

EVALUATION:

1. Observe students assembling hives.
2. Observe student handling bees.
3. Score tests and quizes.

RESOURCES:

1. The Connecticut Beekeepers Association
2. USDA Bulletins

BIBLIOGRAPHY:

1. ABC & XYZ of Bee Culture, The A. I., Root Co., Medina, Ohio.
2. Beekeeping for Beginners, USDA Bulletin #158.
3. Identification and Control of Honey Bee Diseases, USDA Bulletin #2255.
4. Pesticides and Honey Bees, USDA Bulletin #563.
5. Selecting and Operating Commercial Beekeeping Equipment.
6. Supplemental Feeding of Honey Bee Colonies, USDA Bulletin #413
7. Correspondence Course #70, Beekeeping, Pennsylvania State University College of Agriculture, Extension Service.

MEDIA:

1. University Park Pennsylvania 1,6802